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EDITORIAL ANNOUNCEMENTS.

THE BRITISH AND EASTERN CONTINENTS edition of the Railroad Gazette is published each Friday at Queen Anne's Chambers, Westminster, London. It consists of most of the reading pages of the Railroad Gazette, together with additional British and foreign matter, and is issued under the name Railway Gazette.

CONTRIBUTIONS.—Subscribers and others will materially assist in making our news accurate and complete if they will send early information

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FRIDAY, MARCH 2, 1906.

A liberal extract from the Wallace testimony before the Committee on Inter-oceanic Canals is printed this week. It is interesting as a historical document, because it shows graphically the tremendous difficulty our government has had—and is having—in organizing the work at Panama on a practical basis. Incidentally, we think that no one will be disposed to criticize Mr. Wallace after he has read the testimony. But the meaning of it is broader than that. It shows the confusion that must arise when a distinguished engineer, accustomed to put through construction and executive enterprises of the first magnitude with undivided responsibility, does not know whether he has been appointed by a committee, a commission, Congress, the Secretary of War, the private lawyer of the administration, or the President of the United States. We have it on the highest authority that a man cannot serve two masters—Mr. Wallace was expected to serve six, and to report to one or two other unclassified authorities as well. We believe firmly that the Panama Canal is going to be built, and built in a manner creditable to the United States; we trust most devoutly that the present period of crude and unstable organization will be brought rapidly to a close. Great works can be successfully carried through under the military system of graded responsibility or under the civil system of undivided responsibility; but at Panama we have neither one thing nor the other, and the pity of it is that so useful a man as Mr. Wallace should have been sacrificed to demonstrate this. The fundamental difficulty seems to be that government work is everybody's business, while Congress, as the representative of everybody personified, must needs dig up the seed every day or two to see if it has sprouted, and how fast it is growing. Two things seem highly essential at the present state of affairs; that a simple, definite, and withal an honest organization be perfected, and then that it be left alone, for better or for worse, until it has had time to demonstrate beyond doubt or cavil the measure of its capacity.

It looks as though South Carolina would have to have a law forbidding the working of trainmen excessive hours, for the State Railroad Commissioners who condemned the practice in a report on a collision a few months ago (Branchville, April 2; *Railroad Gazette*, May 26, page 573, and November 3, page 416) are now compelled to report on a similar case again—and to conclude that their warning has not been heeded. Reporting on a butting collision

near Blaney, on the Seaboard Air Line, January 30, where four trainmen were killed and 2 injured, they say that—

"The wreck was caused by the freight crew leaving Blaney sidetrack against orders. The crew had orders to remain in the sidetrack at Blaney until both trains Nos. 81 and 66 had passed—train No. 81 going south, and No. 66 going north.

"However, we must condemn the practice of working crews as long as the crew of extra freight No. 658 were worked. The testimony clearly shows that this crew was on duty for 25 hours and 32 minutes. Conductor Sondley of the extra freight No. 658, admitted that he was asleep and that all of his crew were asleep while the freight was in the sidetrack at Blaney (55 minutes) and that they thought train No. 66 had passed. We believe that the whole crew was asleep, thus losing sight of the fact that two trains were to pass instead of one. This is the second serious wreck which has occurred within a year on account of the overworking of crews on freight trains, and we must condemn this practice, not only because it endangers the lives of the crews, but on account of the danger to the traveling public."

This case illustrates the wisdom of the rule of the Great-Western Railway of England, mentioned in our issue of February 16, page 146, that trainmen must be relieved after a certain number of hours, even if the relieving men have to be sent out to pick up the train at some point on the road. There was a provision against overwork on the Seaboard Air Line, but it appears that it was not adequate or was not carried out. According to the report, the conductor, being asked if conductors have not a contract with the railroads that after being on duty a certain number of hours a rest can be demanded, replied that a rest can be demanded only at terminals, and then only after registering that rest was needed. He said he asked the operator at Cassatt to request despatcher at Raleigh to make work between Cassatt and Columbia as light as possible, as his crew were worn out, and that the despatcher replied "O. K." The despatcher, when asked about rules demanding rest by crews, stated that Conductor Sondley was correct in stating that rest can be demanded at terminals, but that no rule stated that rest could not be demanded at other points, and that "very frequently he receives requests for rest orders and he always grants such requests, allowing trains to take siding and remain dead until sufficient rest has been secured by crew. No request had been made of him by the freight crew for rest. If he had received such a request he would have ordered them to tie up at some switch. Such requests are generally made to the superintendent or the train master." All of which once more enforces the lesson that trainmen cannot be in-

variably depended on to carry out proper rest-rules any more than we can depend for safety from collision on enginemen's regard for the safety of their own lives. Conductors and brakemen will take risks to make a little money, and enginemen will take risks for the sake of saving time or of avoiding the unpleasant duty of defending an act, however well justified, which has produced unpleasant results.

Though the South Carolina commissioners justly condemn the overworking of men, for which error the company is responsible, they just as clearly place the chief blame for the collision on the men in charge of the freight train, where it rightly belongs. For these men, however tired they may have been, or however long or soundly they may have slept, were awake when they committed their fatal error. The conductor admits giving the order to proceed, and the engineman must have been awake to start his engine, and, besides, he did some switching before starting. This engineman was killed, so that we do not know much about his acts or mental processes, but for a man to assume or conclude that two trains have passed while he has been asleep, or even partially asleep, without any positive evidence as to the time or times, or other circumstances, indicates grave mental or moral delinquency. One brakeman claims to have told the engineman that the opposing passenger train had not arrived. This brakeman expected the collision, and got the front brakeman to go back with him to the caboose. One can imagine circumstances where it would be easy to accept excuses for sleeping while a train is lying on a side track, but it is utterly impossible to excuse taking chances on the main track, after waking. This case indicates that the superintendent of this division not only has a duty in the matter of regulating the working hours of his trainmen, but also in regulating their habits of mind; that is to say, their respect for rules and their sense of responsibility.

BANKER-DIRECTORS.

The retirement of members of the firm of Kuhn, Loeb & Company from the boards of directors of the railroads in which the firm has long been directly represented can be traced more or less directly to the recent insurance investigation. It was Mr. Jacob H. Schiff, the senior partner in the firm, who at the time of the Equitable disclosures spoke out strongly against the present system of directorship in great corporations. His view was that the director in many if not in most instances had come to be considered a negligible quantity by the executive officers. This statement was coincident with Mr. Schiff's resignation from the board of the Equitable Life Assurance Society. The firm's own explanation of the more recent action is as follows:

"The reason for this step is the steadily increasing difficulty which the members of the firm have been experiencing in meeting the demands of their own business and at the same time giving the necessary time and attention to the performance of their duties as directors of corporations."

This is undoubtedly one reason, and a good one, for the step. In the *Railroad Gazette* of October 20, 1905, under the title, "What Should Directors Direct," English and American systems of railroad directorship were contrasted and a plea was made that the American director should not be expected to give the minute detailed oversight to technical departments that was expected in England. On the other hand, it was said in that editorial, that the highest duty and most serious responsibility of directors was in appointing officers, in promoting from the inside so far as possible, in making or reforming the organization so that it will work efficiently and without friction, in watching intelligently the result of the officers' work, and in infusing enthusiasm and loyalty.

It is easy to see how members of a firm of bankers, a single department of whose business—that of bond sales—is said to have amounted to half a billion dollars during the last year, may find it hard to give the time demanded for this ideal of American railroad directorship.

Yet there is another side to the work of the banker-director which is so vital to the conduct of an American railroad that it would indeed be rash to say that Kuhn, Loeb & Co. have taken the only ethical position. There is no country in the world where the capital needs of the transportation system are as urgent and as changeable as in the United States. When the Southern Railway was reorganized in 1894, a mortgage for \$120,000,000 was placed upon it to provide for the requirements of a long series of years, as then anticipated. Since that time it has doubled its mileage and nearly trebled its gross earnings per mile. It may be

urged that the new mortgage for \$200,000,000 to fund the obligations incurred in this expansion and to provide for future requirements could just as well have been negotiated if Messrs. J. P. Morgan & Co. had been less closely affiliated with the property, but this is by no means certain. So, too, when John W. Gates descended upon the Louisville & Nashville like the wolf on the fold, and a serious panic was pending as the result of the sale of unlisted stock which was not a good delivery, this same house, through its intimate railroad connections, was able not only to assume the contracts but to place the property out of harm's way. In theory, if the directors of a railroad concern content themselves with working the property and planning its finances, the bankers can co-operate wholly from the outside, but in practice it is often most helpful to have their interest greater than this.

In short, at the present stage of American development and doubtless for very many years to come, the relation between the railroad and the banker will have to be a very close one, and it may fairly be asked whether it is not better that this relation should be frank and acknowledged. There are perils both ways. The attitude of the banker-director must be such that he engenders no shadow of suspicion due to the fact that he is at once a member of the railroad board and of the firm which is primarily interested in the company's securities. But there is nothing impossible in such a relation. The more immediate question raised by Messrs. Kuhn, Loeb & Co. deals with the ability of the banker-director to direct, and this would seem to be chiefly a question of fact. We have never heard Charles H. Coster spoken of as a dummy director, in spite of the many and complex interests with which he was connected. Yet the recent resignations are thoroughly in line with the great awakening of the public conscience in corporate matters; the attitude of the firm, based as it is on a question of fact, is above criticism, and should do much to eliminate from railroad boards all over the country the element that does not belong there, and is a hindrance, physical and moral, to the best development of the properties. When railroad directorates are honest and efficient it does not matter much whether their membership includes bankers, lawyers, engineers, or ministers of the gospel!

SOME CONSEQUENCES OF THE CHESAPEAKE & OHIO CASE

It is not so much what was actually decided in the recent case of the Interstate Commerce Commission against the Chesapeake & Ohio, as what was implied, that has excited comment and surmise on all sides. The case was what the lawyers call one of first impression. There were no precedents exactly in point. It was interesting and important for this reason alone, to go no further into the merits of the controversy. Any case that calls forth from the Supreme Court of the United States the admission that there are no authorities on the question to be decided is an epoch-making decision because it develops the law and removes its confines a degree further into the domain of untried and undetermined questions. It catches and chains for the common uses of the law those nebulous, wandering and fugacious problems that refuse to emerge from the clouds of doubt until held and fixed by a solution of the court of last resort.

Here the exact point decided was that the Chesapeake & Ohio could not deliver to the New Haven coal purchased or mined by itself, at less than the cost of the coal and the transportation charges in its published tariff. And the reason given by the court is that if this could be lawfully done, it would open a way to ship at less rates for one person than for another, and so nullify the prohibition against discrimination in rates. The court accordingly holds that the arrangement was unlawful, and being so neither side could or should enforce it. The consolation to the Chesapeake & Ohio must be that it thereby escapes a loss of \$100,000 on its deal with the New Haven, while the latter may comfort itself with the reflection that, after all, its profitable contract with the Chesapeake & Ohio was really unlawful, and it did very well to have gotten so far along with it before this unsatisfactory interruption.

The broad and plain principle here involved and decided is that a carrier may not charge less than its published rates by producing, or dealing in, the subject of transportation.

The court has not actually decided that a carrier may not engage in any business except that of transportation, but then there are some necessary implications on this subject which the roads so engaged would do well to consider. We are confronted with conditions in respect to the period when carriers first became involved in such outside business and then again in respect to the charters

which authorize it. Some of these railroads acquired the right or exercised the power of such dealing before the Interstate Commerce Law was passed, while others did so after that. Some roads claim the privilege by virtue of early charters, granted generously and readily in times when the abuses of them were neither imagined nor realized. And such roads claim immunity from disturbance in their charter rights, notwithstanding changes in state constitutions, on the ground that corporate charters are contracts between the state and the companies chartered, and so inviolable under the federal constitution. Those carriers, whose charters, though equally favorable, are neither so ancient nor so entrenched, still claim that their corporate privileges cannot be abridged for reasons as applicable to them as to their more venerable fellows.

Through the haziness surrounding such differing conditions, and the claims attending them, there shines the light of one or two fixed principles which may show a way out of these perplexing questions. First, there is the doctrine so often promulgated and so freely acknowledged, that no state may pass any law or confer any right in conflict with the constitution that binds all the states, or with any law of Congress passed by the authority of that invincible instrument. And there is yet another principle, not so often pronounced, nor so familiarly known, but equally fixed and essential, that every measure of Congress passed under the mandate of the constitution requires the subjection and abandonment of all rights or privileges inconsistent with it, however inveterate or lawful they may theretofore have been. Even those most injuriously affected by the application of these powerful and pervasive principles must realize the cogency and necessity of them. For what is essential to the welfare of the whole state compels the acquiescence of all its citizens.

It would seem to follow that it matters little in determining the survival of a right inconsistent with a law of Congress, that such right arose prior thereto. In considering such questions, it is a necessary and fundamental presumption that all rights are granted subject to the constitution and the powers to be exercised by Congress for the benefit of all the people. Such rights therefore are to be considered as accepted upon the condition that, when inconsistent with a statute subsequently enacted, they must be at once and forever abandoned.

And thus that the rights of carriers arose prior to the Interstate Commerce Act, seems quite immaterial on the question whether they survive the passage of that Act. That question is to be determined by an entirely different test: Do those rights conflict with the law?

Those carriers who claim under ancient charters may occupy impregnable positions against attacks by the state granting such charters, and yet be helpless and defenceless under a federal law. No state by its constitution or its statute can grant a right inconsistent with the constitution of the United States or repugnant to any power granted thereby to Congress. It is immaterial whether a state charter is safe from state attack, or that such charter was granted prior to the exercise by Congress of any power conferred upon it. All state charters must, under the principles above stated, be held to have been granted subject to the exercise by Congress of its constitutional powers. And those powers do not originate as of the date of the statute exercising them, but of the date of the constitution itself, which, in contemplation of law, no charter may transcend, precede or withstand. The Haddock and Cox cases, decided by the Interstate Commerce Commission, seem to authorize the inference that the fact that a carrier was, prior to the enactment of the Interstate Commerce law, authorized by charter to be a dealer in commodities transported by it, exempts such carrier from the operation of the decision before us. But it will be found, we think, when this question is directly presented that such position will not and cannot in the nature of things be sustained.

An erroneous decision long undisturbed and frequently recognized becomes in time a rule of property, which the higher courts are loth to abrogate. But this reluctance does not extend to subverting the uniform policy of the nation, and when such rule works out results hostile to that policy the courts have not hesitated to destroy the rule in order to preserve the policy. At best, such decisions are binding, if at all, only upon the courts, and if they evince too much conservatism—and their faults lean on that side of virtue—the legislature may at any time change such bad, case-made law, to conform to its general policy.

From these considerations we are bound to conclude that those carriers who claim exemption from the results of this interesting decision by virtue of their charters antedating the Interstate Commerce Act, or being invulnerable from state assault, are buoyed

up by vain hopes, doomed to disappointment. Equally unavoidable is the conclusion that those railroads who are engaged in any other business than that of transportation will eventually have to choose between that other business and interstate transportation. For a carrier that ships its own merchandise over its own road will, by an irresistible temptation, discriminate in favor of itself as a shipper, and thus accomplish the evil that the law forbids; and as the law does not permit one to pursue a course where his interest is constantly opposed to his duty, and especially where duty may be so easily, secretly and effectually sacrificed to interest, the ban of prohibition will ultimately and accurately extend to the cause which tends to produce such forbidden results.

This development and extension of the decision under view may not proceed rapidly or by a regular and measurable progression. Events of large import succeed each other, sometimes quickly, at other times with inexplicable tardiness. On the whole, it is doubtless true that development of law is slow, and wisely slow, that interests affected may gradually adjust themselves to the new conditions without the loss and confusion that a whirlwind of change would entail. But the law, if it advances slowly, at least never recedes. What progress it makes, it never surrenders, and where the way is clear and the occasion urgent, and opportune, the advance is as expeditious as it is timely and salutary. If, emboldened by its success in this case, the Interstate Commerce Commission should ask the court to prohibit the coal roads from dealing in coal as incompatible with the duties of interstate carriers, the questions here suggested would be presented for decision. And then we should doubtless know what now we may merely believe.

Report of the Illinois Railroad and Warehouse Commission.

The thirty-fifth annual report of the Illinois Railroad and Warehouse Commission for the year ending June 30, 1905, recently transmitted to the Governor, again directs attention to the fact that Illinois continues to have the largest mileage of main track of steam roads of any state in the country. The total mileage of main line and branches was 11,637, an increase of 108 miles over the previous year. The total mileage of all classes of tracks was 20,065. The total capital per mile of road is \$60,271, which is slightly less than the year before. Casualties showed a considerable increase, 66 passengers being killed, or one for every 811,322 carried, and 707 were injured, or one in every 75,739 carried.

The total income of all steam roads within the state from operation was \$150,632,745, an increase over the previous year of \$10,883,353. The total income from passenger service, including mails and express, was \$38,845,522. Freight service yielded \$88,406,542 and unclassified earnings were \$9,178,296. The total number of revenue earning passengers was 53,547,290, an increase of 39,092. The average distance each passenger was carried was 32.7 miles, and the average amount received per passenger was 59 cents. The average amount earned per mile of line by passenger service was \$3,176, an increase per mile of \$253.

The revenue freight tons were 123,584,087. The average haul per ton was 111.6 miles, the average amount received per ton 75 cents, and the freight earnings per mile of road \$7,086. There was an increase of 1,556 tons of freight hauled and an increase in the average distance hauled of 9.9 miles, while the average amount received for each ton was decreased 1 cent. The operating expenses per mile of road show a decrease of \$44, while the net earnings per mile of road increased \$230. Figures for fuel consumption show an average of 101 lbs. per mile in passenger service and 168 lbs. per mile in freight service. The total consumption for all services was 8,049,595 tons.

A further marked increase is shown in the mileage of interurban electric roads. The total for surface, electric and elevated lines, exclusive of street railways, was 763 miles, an increase over the previous year of 176 miles. The total capitalization per mile of road of these classes of roads, which in 1904 was \$222,615, decreased to \$193,338. This high figure is due to the extremely high capitalization of the Chicago elevated roads, which is \$2,052,867 per mile, against \$82,694 for the surface roads.

An increase in income of \$582,383 is shown, the total being \$10,354,559. Of this \$363,588 was for freight service. Special reference is made in the report to the increasing volume of business of these lines in the transportation of package freight. The fact that the interurban lines are engaged in transportation business exactly similar to the steam roads causes the Commission to recommend that all laws applicable to steam roads be made by law equally applicable to the interurban electrics.

The interurban and elevated roads killed 29 persons, of which only three were passengers, seven were employees and 19 "others." This is seven less than the previous year. The total number injured was 491, or one more than the preceding year.

Pressed Steel Car Company.

The seventh annual report, covering the calendar year 1905, shows profits of \$1,106,901, against a loss of \$707,111 the previous year, and profits of \$2,768,897 in 1903—clear evidence of the fluctuating conditions recently prevailing in the car building industry. During the three years the 7 per cent. dividend on the preferred stock has been maintained. After the \$875,000 required for this payment and \$175,000 charged off for depreciation, in 1905 there was left a surplus of \$56,900, contrasting with a deficit of \$2,037,111 in 1904. The total surplus, including profit and loss surplus carried over, was \$2,588,775 in 1905, against \$2,531,874 in 1904 and \$4,568,985 in 1903. The gross sales for 1905 were \$19,357,826, nearly \$15,000,000 greater than for 1904, when they were only \$4,498,268, far the smallest figure in the company's history. Sixty per cent. of the gross sales for the past year were made in the last five months. The Pennsylvania Car Wheel Company, one of the subsidiary companies, during the year acquired a majority of the stock of the Pennsylvania Malleable Company, which controls the Central Car Wheel Company. Both have plants at McKees Rocks, Pa., adjacent to the Pressed Steel works. A new departure in the company's business is the construction of separate works, now almost completed, for building passenger cars. During 1905 the first all-steel street railway car was built for the Metropolitan Street Railway, of New York City.

Gross sales of the Western Steel Car & Foundry Company for the year were \$7,563,194. Net profits of this company are not given, but from them a 6 per cent. dividend was paid. On the whole, the statistics given in the report are most meagre. The brief summary of the various allied companies may be worth repetition:

The Pressed Steel Car Company has works at Allegheny, Pa., and McKees Rocks, Pa., with a capacity of about 150 all-steel or steel and wood composite cars per day. Its new steel passenger car shops are to have a capacity of 750 cars per year.

The Western Steel Car & Foundry Company has works at Hege-wisch (Chicago), Ill., and Anniston, Ala., with a capacity of about 100 cars per day.

The Canada Car Company, Limited, whose plant has just been completed at Montreal, has a capacity of 6,000 freight and 150 passenger cars per year.

The Pennsylvania Car Wheel Company's foundries at Allegheny, Pa., have a capacity of 250,000 car wheels per year.

The Pennsylvania Malleable Company and Central Car Wheel Company have a capacity of 23,000 tons of iron, steel and malleable castings and 100,000 car wheels per year.

The subjoined table gives the gross as well as net earnings and surplus for the year in each of the seven years since the company's organization:

	Gross sales.	Net earnings.	Surplus.
1905.....	\$19,357,826	\$1,106,901	\$56,901
1904.....	4,498,268	*707,111	†2,037,111
1903.....	26,601,249	2,768,897	1,008,897
1902.....	33,883,519	4,578,114	2,903,114
1901.....	23,032,491	1,927,925	409,290
1900.....	22,540,115	2,075,181	1,200,181
1899.....	14,108,212	2,237,000	612,000

*Loss. †Deficit.

President Carroll D. Wright, of Clark College, Worcester, Mass., is an authority on political economy and, therefore, is to be listened to when he speaks on a subject in that field. In a lecture before his class in statistics and social economics on "Efforts Made by States to Regulate Industry," he is reported to have said recently: "If I am a minister of the Gospel and I go to a ticket office and ask for a ticket at half price, and get it, just why should I preach against rebates next Sunday? Ethically, there is no difference between John D. Rockefeller getting a discount on the transportation of his oil and the Christian Endeavor Society going to San Francisco for a convention at wholesale rates. We damn the one, and some seem to wish the damning to extend beyond this earth; but we applaud the other for doing the same thing." One reason why the preacher should not talk about rebates in his pulpit is that the question has no place in preaching. Rebates may or may not be immoral; and even when presumably immoral are surrounded by so many difficult questions that they can be discussed with profit only where all sides can have their say. But the preacher who accepts a rebate and then denounces Rockefeller is the person aimed at, we suppose; and it must be that Dr. Wright has been misquoted. Surely, he must recognize the difference between an open rebate made to clergymen on the basis of the general public sentiment that they are debarred from accumulating wealth, and a secret rebate paid to a big shipper to aid him in killing off small shippers. As for the San Francisco convention, the railroads earnestly desire the privilege of reducing rates on certain occasions of that kind, in order to increase the profits of their business; would Dr. Wright forbid them? It is true that Christians who do not endeavor may seem to be discriminated against; but have any of them ever complained? Possibly they deserve the punishment, for not belonging to the society! The

Hebrew drummer whose visit to California happens to be timed for the convention date ought to have his interests attended to—but perhaps he knows enough to attend to them himself!

The latest decision issued by the Interstate Commerce Commission, prepared by Commissioner Prouty, affords a fine example of fruitless government activity. The New Haven road has decided that through rates on oil from Pittsburg to New England points are so low that it prefers to go without the business—to give it freely to its competitors, and on business to local non-competitive points to charge local rates for its own part of the haul. It would seem that ordinarily this ought to be the privilege of any carrier. But the course taken by the New Haven greatly favors the Standard Oil Company and the Commission virtually declares it against public policy; but finally has to decide that nothing can be done to remedy the alleged injustice. The case is that of the Fred G. Clark Company against the Lake Shore & Michigan Southern and others, and the Waverly Oil Works against the Pennsylvania and others, the New York, New Haven & Hartford being the principal defendant. The New Haven participates in through rates to New England points on other traffic generally. The Standard Oil Company brings crude oil by pipe line to its seaboard refineries and sends the refined oil and the products by tank steamers to distributing stations at Wilson Point, India Point, New London and East Boston. From the distributing stations the oil and products are shipped out locally to interior points. Independent shippers like complainants, are obliged to send shipments by rail to the same destinations. The Commission holds that the combination rates on petroleum and its products from Cleveland and Pittsburg to points reached by the New Haven Company result in unjust rates; that the refusal to participate in through rates is unreasonable, and that the situation is such as to operate greatly to the advantage of the Standard Oil Company. But there is no competitive relation between petroleum and its products on the one hand and other articles of traffic on the other, and the failure to provide joint rates on petroleum, while maintaining joint rates on other traffic, does not constitute wrongful preference and advantage. The Act to regulate commerce does not authorize the Commission to compel the establishment of joint rates, and therefore, notwithstanding the rates complained of are held unjust and the general shipping situation is such as to work a practical monopoly in favor of the Standard Oil Company, the Commission holds that it is without authority to grant relief in these cases.

A committee representing the Brotherhood of Locomotive Engineers appeared before the New York State Railroad Commission the other day and, according to a New York city paper, protested against the practice on several of the railroads hereabout of sending out light engines such as inspection engines which stop along the lines and fail to send out flagmen. It is asserted that this practice is likely to lead to accidents and confuses the engineers of the regular trains. Commissioner Dickey, who acted as chairman, said that he would do everything in his power to stop the practice. The committee also protested against the Priest flange scraper, "a mechanical contrivance attached to locomotives for the purpose of cleaning rust and dirt from the sides of rails." The engineers are reported as saying that the contrivance is dangerous. This "news" has the earmarks of a fictitious issue. The protest looks like a diversion, the preparation of which served to while away an hour which otherwise would have been dull. We hate to think unkind thoughts, but find it hard to assign any more sensible motive for the first protest than that of helping the brakemen to put in a few more days next month—though friendliness between enginemen and brakemen is a commendable thing. If Commissioner Dickey desires to do everything possible—not merely to please his visitors but to promote safety, he will do well to require that the offending railroads, if he can find them, shall protect each light engine which has to stop between stations by holding all following trains at the last preceding station until the light engine reports at the next following station. That is the simplest cure for this kind of complaint. It will make the flagman unnecessary. As regards the second protest, the query naturally arises whether the intelligence of the complainants concerning the behavior of the flanger is not, perhaps, of the same quality as that which the reporter displays in describing it!

In the 1,236 columns of news that have been telegraphed from Washington, within the past two or three months, on the "Rate question," the funniest item is that of last Saturday reporting Senator Elkins' proposition for helping the coal mine operators of West Virginia, who have complained that the railroads discriminate against them. Senator Elkins says that he would have voted in committee for the Hepburn bill as it came from the House [without the much discussed court review provision] if the committee had allowed one amendment which he had proposed and which

vitality affected the interests of his state, West Virginia. This amendment was as follows:

That carriers of interstate commerce shall, upon application, put in all necessary switches to meet wants of shippers, make prompt connections and operating arrangements with connecting branch or lateral lines, reasonable and just division of through rates and make reasonable and just allowances to connecting, lateral or branch lines for originating freight.

The queer feature is in the last two words. At this distance from the Senate chamber an allowance to a lateral line for "originating" freight seems to be translatable in only one way; it is a rebate to a coal shipper who has a short track from the railroad to his mine. The honorable Senator seems to have been imposed upon by some one of his neighbors who is in the coal business and who wishes to be able to do business *a la* Hutchinson salt works. Who would ever have suspected that the universal—absolutely universal—denunciation of rebates that has filled the ears of the public for the past 15 months would culminate in a bill to legalize rebates in almost the worst form that could be imagined?

NEW PUBLICATIONS.

The Earning Power of Railroads—Edition of 1906. Compiled and edited by Floyd W. Mundy, of Jas. H. Oliphant & Co., 20 Broad St., New York. Price, \$2.

This is a handbook of tables and notes showing facts as to earnings, capitalization, dividends, mileage, etc., of 125 railroads in the United States and Canada. The introductory chapters deal with the general theory of a railroad annual report, viewed from the standpoint of the investor, as a means of determining what the property is worth and what it can earn. A number of convenient rules of thumb are given, together with qualifications of their use. The principal part of the book is devoted to an analysis of the annual reports of the roads included, giving through a series of years the principal facts which the banker and investor wishes to know. There are over a hundred pages of notes at the end of the book devoted to roads whose statistics are not wholly self-explanatory. This is a very convenient book to have on the desk for ready reference.

TRADE CATALOGUES.

In 1894, the Master Car Builders' Association, for convenience in the filing and preservation of pamphlets, catalogues, specifications, etc., adopted a number of standard sizes. The advantages of conforming to these sizes have been recognized, not only by railroad men, but outside of railroad circles, and many engineers make a practice of immediately consigning to the waste basket all catalogues that do not come within a very narrow margin of these standard sizes. They are given here in order that the size of the publications of this kind, which are noticed under this head, may be compared with the standards, and it may be known whether they conform thereto.

Standards.

Postal-card circulars	3 3/4 in. by 6 1/2 in.
Pamphlets and trade catalogues	3 1/2 " by 6 "
	6 " by 9 "
	9 " by 12 "
Specifications and letter paper	8 1/4 " by 10 3/4 "

Economizers.—Bulletin No. 128 entitled "Economizers," in the Sturtevant Engineering Series, has recently been issued by the B. F. Sturtevant Co., Boston, Mass. This publication briefly outlines the essential features of an economizer, displays the advantages of the Sturtevant type with staggered pipes and metal-to-metal joints, and by means of well selected photographs clearly illustrates the important parts of these machines.

Railroad and Contractors' Supplies.—The Kalamazoo Railway Supply Co., Kalamazoo, Mich., is sending out an advance bulletin to be followed shortly by complete catalogue No. 14. The bulletin shows a few of the important specialties made by this company, including a variety of hand, push and velocipede cars, cattle-guards, track jacks, levels and drills, water tanks and pumping engines. The bulletin is 7 1/4 in. x 10 1/4 in., and has 40 pages.

Bolt Cutters.—Bulletin No. 10, issued by the National Machinery Co., Tiffin, Ohio, fully describes and illustrates the national single bolt cutting machine. Samples of work threaded on these machines are shown and the detailed illustrations of the various parts of the machine are remarkably good and clearly illustrate the principal features of the mechanism.

Contractors Dump Cars and Rail Cars.—Benjamin Watson, 66 Beaver street, New York, eastern representative of the South Baltimore Steel Car & Foundry Co., has just issued a 10-page folder containing illustrations and general dimensions of its complete line of narrow and standard gage contractors dump cars.

Rock Drills.—A neat 96-page catalogue issued by the Ingersoll-Rand Co., New York, describes and illustrates the various designs and uses of the Ingersoll-Sergeant rock drills. A number of types of both steam and power-driven air compressors are also illustrated.

Coaling Plants, Hoisting Engines, Industrial Railways, etc.—The C. W. Hunt Co., West New Brighton, New York, sends a 24-

page pamphlet containing illustrations and brief descriptions of its general line of machinery, including coaling devices of various types, coal crockers and buckets, pulley blocks and sheaves, "Steve-dore" rope, cable railways, steam and electric hoisting engines, overhead power trolleys, scales, industrial railways and cars and electric locomotives.

CONTRIBUTIONS

The Bismarck Bridge of the Northern Pacific.

New Haven, Conn., Feb. 26, 1906.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of February 23 I note a misstatement in your article on the new Bismarck bridge of the Northern Pacific Railway, more particularly relating to the rectification of the east pier of this bridge, which had moved 44 in. toward the river from its established location. Mr. George S. Morison was called into consultation and furnished plans and estimates which provided for tearing down the old pier and rebuilding it in its proper position, but these plans were not used, and the actual method of rectification adopted was one designed by the writer and carried out under the immediate direction of Mr. W. L. Darling, the present Chief Engineer of the Northern Pacific, who was then Assistant Chief Engineer.

An examination demonstrated that the pier was moving on a slippery 1-in. seam of coal about 5 ft. below the concrete base block of the pier. The movement was due to very unusual conditions, as it was found that in some remote time a large section of the bluff parallel with the bank of the river had broken off and slid to the bottom of the slope. Surface material washing down from the bluff masked this condition and entirely concealed its nature. Subsequently, reservoirs for the Bismarck water works were constructed on the high bluff at the east end of the bridge. Leakage from this reservoir, following the natural seams of the stratified blue clay, was intercepted by the fallen mass, setting up a hydrostatic pressure estimated at 7,000 lbs. per lineal foot, extending for a distance of about 1,500 ft. This pressure, in conjunction with the deepening of the river bed caused by scouring, caused the mass to move on the plane of the thin coal seam toward the river channel, carrying with it the bridge pier.

A deep ditch and tunnel were driven at low water level in order to drain away the water. Observations extending over a period of two years demonstrated that the movement had practically ceased, and it was then decided to attempt the rectification of the pier. The old pier, 100 ft. high, and weighing 1,250 tons, was undermined by parallel galleries which were refilled with concrete and provided with roller planes of old rails, between which 2-in. solid steel rods were placed, which ultimately supported the entire weight of the pier and one end of the 400-ft. span. The new base block thus constructed was built on the original center, with its base 13 ft. below that of the old foundation. Strong machine screws, 4 1/2 in. in diameter, provided with capstan heads, were then attached to the upper line of rails, reacting on the lower base block. The capstan heads, 10 in number, were revolved by means of oak capstan bars or levers.

The work progressed satisfactorily at first, and the pier had been moved 5 in. toward its original center when a local slide of the material from the slope of the excavation occurred. The friction of the steel roller bearings was so little that, while the amount of sliding material was not large, its pressure was sufficient to cause a rapid movement of the pier back to its old center, thus accomplishing in a few seconds the work which it has been expected would require at least 24 hours to complete. This unexpected incident caused the utmost consternation at the time, but resulted most fortunately, as the pier stopped within 1/2 in. of the calculated center.

It should be explained that the expansion rollers for the first and second long spans were on the next adjacent river pier, and that the two spans had been tied together with rods. The anchor bolts on the first pier had been removed and the bedplate well lubricated to permit the pier to move under the span.

All interstices between the rollers and the openings left between the two base blocks were subsequently refilled with concrete, and both surfaces were dowelled together by steel rails embedded in concrete masonry.

The remedy appeared to be entirely efficacious, and no further movement was noted for several years. But in some manner the drain pipe mentioned above became clogged, with the result that an accumulating pressure on the pier was caused which threw it out of line slightly. The pressure was relieved by excavating the material back of the pier.

The plans and calculations for the work were made by Mr. S. J. Bratager, Principal Assistant Engineer. Mr. W. C. Smith was Resident Engineer in charge.

E. H. M'HENRY,

Fourth Vice-President, New York, New Haven & Hartford.

Retirement of William H. Brown.

With the retirement of William H. Brown from the position of Chief Engineer of the Pennsylvania Railroad Company on February 28, 1906, after having reached the age of 70 years, the Pennsylvania Railroad has lost the services of one of its most efficient and trusted officers.

Mr. Brown has kept continually "at it" for the past 40 years, and by his untiring efforts and devotion to his profession, he has become so well versed with the physical characteristics of the great railroad system in which he has played such a prominent part, that he can draw diagrams from memory of the alignment, stations, and crossings of nearly every mile of the main lines. His brain is a vast storehouse of facts and anecdotes of his work and experiences during his many years of active life. Not only has he an unusual memory, but he has also one of the most active minds that one often meets, and he can grasp a proposition and solve it in short order. His motto has always been, "I will never put off until to-morrow what I can do to-day." Whenever a new line was to be laid out or a change of line made, he entered into the work with all his heart, and did not rest until he had completed it. All he wanted was the order to go ahead, and he produced the results. He has always been a hard worker, and frequently has said, during unusually busy times, that there were not enough hours in the day for him.

It must have been a great satisfaction to President A. J. Cassatt to have such a man for chief engineer during the last few years when the Pennsylvania Railroad has been expanding so rapidly, straightening and four-tracking its main lines, and building low grade freight lines. Mr. Cassatt, who is without an equal as a fearless, progressive, clear-headed railroad man, found in Mr. Brown just the person to put into execution and rush the various improvements that have helped to make the Pennsylvania Railroad the system that it is to-day.

Born on a farm in the southern part of Lancaster county, of Quaker parentage, Mr. Brown when he left home to make his mark in the world was equipped with a hardy constitution and a mental and moral stamina that have enabled him to cope with the many perplexing problems that have confronted him. When a young man he saved his money and bought a transit, much to his father's disgust, and with this transit he obtained a view of the field of engineering that opened so broadly before him in the future, and in which he had reached the highest pinnacle of success as a railroad engineer.

He was born on February 29, 1836, and has actually had but 16 birthdays; and indeed to one who sees him at work from day to day, he appears to be of an age midway between 16 and 70 years. A broad minded man used to dealing with extensive engineering and business problems, Mr. Brown was able to handle his department with skill and his advice was almost daily sought by the officers of the company, and frequently on subjects not directly connected with engineering. His employees and those who had dealings with his department knew that all reasonable requests which they might make would be granted, and if there was doubt about their being reasonable requests, Mr. Brown would soon dispel all doubts, as his answer "yes" or "no" would be given immediately and in no uncertain terms.

Mr. Brown's first railroad service was in 1861 as Engineer on United States military railroads, having had some experience on surveys previous to that time. The next year he went to the Pittsburg, Cincinnati, Chicago & St. Louis as Assistant Engineer, being promoted in 1863 to Principal Assistant Engineer. One year later, he went to the Pennsylvania as Assistant Engineer of the Pittsburg division. He was afterwards made Engineer of the Oil Creek Railroad, and later Principal Assistant Engineer of the Philadelphia & Erie division of the Pennsylvania. In 1867 he was appointed Engineer of that division, and two years later was put in charge of the construction of car shops at Altoona, Pa., with the title of Assistant Engineer. He was made Resident Engineer of the Middle division in 1870, Chief Engineer and Superintendent of the Lewiston division in 1871, and Superintendent of the Bed-

ford division in 1872. From 1874 to 1881 he was Engineer of Maintenance of Way of the Pennsylvania Railroad Company, being appointed Chief Engineer on the latter date.

He leaves the service of the Pennsylvania Railroad with the very best wishes of all who knew him and admire his great ability, and with the sincere desire that he may enjoy many years of good health and happiness which he so richly deserves.

E. B. TEMPLE.

President Hadley on the Hepburn Bill.*

In its external form the Hepburn bill for the regulation of interstate commerce, which passed the House at the beginning of February, varies very greatly from the Esch-Townsend bill of a year ago. Practically, however, there is only one important point of difference. The Esch-Townsend bill provided for the creation of a court which would, among other things, afford a speedy and uniform means of hearing appeals from the commissioners' decisions. The Hepburn bill attempts to put these decisions into effect without the intervention of such a court, and to limit rather than facilitate the right of appeal by making the decision of the commission itself final on all questions of fact.

One of the criticisms made against the Esch-Townsend bill was that it provided for two trials of every case—one before the commissioners, another before the special railroad court which that bill created. In the *Boston Transcript* of April 1, 1905, the present writer urged that a single hearing in the railroad court was better than two successive hearings by two different kinds of bodies. Mr. Hepburn's committee desires to avoid the double hearing, but it undertakes to do it by eliminating the court instead of the commission.

There is reason to fear that this plan will not work.

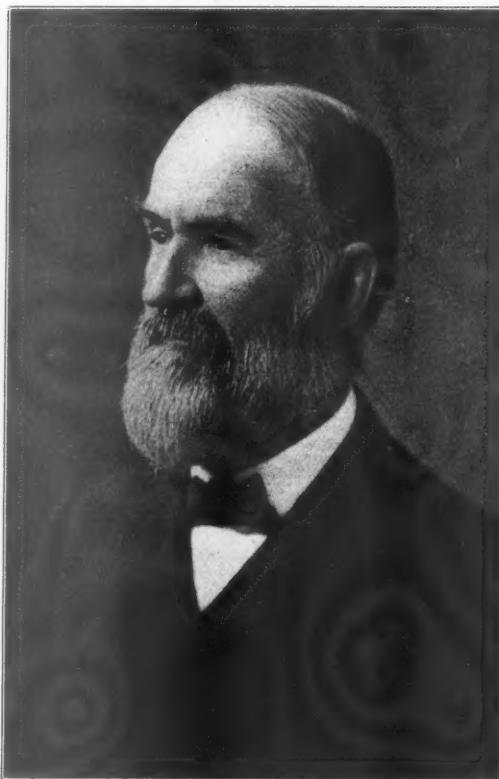
In the years 1871 and 1872, the railroad situation in England had many points of resemblance to that which now exists in the United States. The consolidation of independent companies had gone so far that the railroad system of England, like that of the United States to-day, was managed and controlled by a comparatively small number of men. The most serious forms of personal discrimination had been prohibited by the Railway and Canal Traffic Act of 1854, as they are to-day prohibited by the Elkins Act in the United States; but there was a great deal of unfairness in granting facilities and much arbitrary difference in rates for different commodities and different localities. The English local shippers felt themselves quite as helpless against these forms of railroad preference as the shippers in the United States do to-day. The courts were slow in giving

redress, and were inclined to tolerate a great many things to which not only individual shippers but chambers of commerce seriously and justly objected. Under these circumstances there was a demand for a tribunal which should be ready to deal with railroad rates instead of reluctant; which should give the quick decisions and secure the prompt compliance with those decisions which was needed in order to make them do any good.

Two investigating commissions, one in 1867 and another in 1872, showed how great was the complaint and how wide the demand for special legislation. The outcome of these inquiries was an act known as the Regulation of Railways Act, 1873, which had many points of resemblance to the Hepburn bill. It provided for a commission which, besides ascertaining the rates charged by railroads and making reports to Parliament concerning their management, should also be empowered to investigate complaints concerning unjust rates or discrimination in facilities and give adequate and speedy relief. It was intended to have the quick jurisdiction of these commissioners supplant the slow jurisdiction of the older courts. I quote from Section 6 of the Regulation of Railways Act, 36 and 37 Vict. Ch. 48:

For the purpose of enabling the commissioners to hear and determine the matter of any such complaint, they shall have and may exercise all the jurisdiction conferred by Section 3 of the Railway and Canal Traffic Act, 1854, on

*A paper by Arthur T. Hadley, LL.D., President of Yale University, in the *Boston Evening Transcript*, Feb. 24.



William H. Brown.

the several courts and judges empowered to hear and determine complaints under that act; and may make orders of like nature with the writs and orders authorized to be issued and made by the said courts and judges; and the said courts and judges shall, except for the purpose of enforcing any decision or order of the commissioners, cease to exercise the jurisdiction conferred on them by that section.

The twenty-sixth section of the same act undertakes to restrict narrowly the opportunity for appeal from the judgment of the commission. The commissioners themselves may state a case; on the case thus stated, and no further, the courts on appeal may decide what is the law. This was intended not only to shut out the retrial of questions of fact, but to give to the commission, as far as the circumstances admitted, the power of deciding which were questions of fact and which were not.

Much good was expected from the Act of 1873. But in its actual workings it proved a serious disappointment, and Parliament in its recent legislation has gradually abandoned the theory on which that act was based. And let this significant point be noted: Parliament abandoned this theory, not because it hurt the railroads, but because it failed to benefit the shippers. The power of quick decision which the Act of 1873 gave the commissioners was in large measure illusory. The courts insisted on retrying questions in their entirety, instead of acquiescing in the attempt to separate the law from the facts. This was an almost inevitable result; partly because laws and facts were things so closely interwoven that it was hard to separate them, and partly because the courts in England, as they do in every other country, resented attempts to infringe upon their jurisdiction and made difficulties for every legislative act that undertook to do so. The consequence was that the shipper, instead of finding a case decided in his favor without appeal, was subjected to a roundabout and circuitous course of litigation, with the courts prejudiced against him, because they were anxious to vindicate their own past functions against legislative interference. This may sound like a fanciful and far-fetched difficulty, but it is a real one, which has its roots deep in human nature. Hear what the Select Committee on Railways of 1882, itself by no means over friendly to the railroad interest, says of the working of this provision of the act:

Your Committee think that a case has been made out for granting to litigants before the Railway Commission a right of appeal. Important matters, many of them "prime impressions," which fix the law and practice all over the United Kingdom, come up from time to time for decision, and it appears to your Committee that one recognized appeal to a higher court would not only be just but much more satisfactory than the present circuitous and uncertain motions for a prohibition, to which defendants are now constantly having recourse.

Whatever differences of opinion there were in the Committee of 1882—and there were many—all agreed that the attempt to prevent appeals from the commissioners' decisions had been a complete failure.

Not the individual case only, but the whole apparent attitude of the courts toward the matter of railroad legislation, may be prejudiced by a statutory provision of this kind. In suits brought before them at common law the attitude of the courts is friendly to the individual trader rather than to the modern corporation. The rights of the individual trader are a good deal more ancient and his common law standing somewhat better established than those of the large joint stock company. But when it comes to an attempt to infringe the common law rights of a company by acts of special legislation, the case is reversed. The courts view these special acts with close and suspicious scrutiny. They are placed, almost in spite of themselves, in a mental attitude favorable to the corporation and adverse to the individual complainant—favorable to the railroad and adverse to the shipper. The history of the Interstate Commerce Act has already shown us the effect of this mental attitude. Even where the courts have decided against the railroads, they have tended to do so on grounds of common law, rather than of statute. Take the recent case where the Chesapeake & Ohio sold coal to the New York, New Haven & Hartford at a less price than individual shippers were obliged to pay. The Supreme Court decided the contract to be an illegal one on general grounds; but it at the same time threw out all complaints of discrimination as defined by the interstate commerce act. Now, if a statute, in addition to its novelty, contains a provision intending to limit the powers of the courts to supervise its operation, the courts will almost certainly find some way of making it null and void. This renders our legislation wholly ineffective, puts the courts on the side of the big man when they ought naturally to be on the side of the little one, and creates a feeling of popular irritation against the judicial system which is dangerous anywhere, and most of all in a democracy like our own.

But the evil effects of the attempt to give the English Railroad Commission power of fixing rates did not stop here. The attempted performance of this duty took up so much of their time that they failed to perform other duties, which under more favorable circumstances they might have carried out efficiently and usefully. They did not have that influence on the formation of railroad tariffs which their experience and high position would otherwise have secured.

What an advisory commission can do to influence railroad management in these ways was shown by the history of the Massachusetts Railroad Commission under the leadership of Mr. Charles Francis Adams in the years from 1870 to 1875. It was shown in other States, notably in Iowa, in the decade immediately following. It is exemplified in England, even under somewhat unfavorable conditions, in the results of the conferences between the board of trade and the railways. It was illustrated in the history of the Interstate Commerce Commission itself during those first bright months of its existence when its members considered themselves in the light of advisers of the railroads or the public, and had not asked for powers which have since proved their undoing.

The possibility of giving successful advice is dependent upon the fact that your advice is advice, and is not a command disguised under the form of courtesy. In trying to become a poor kind of court you forfeit the chance of becoming a good kind of commission. In obtaining authority to settle specific rates you lose the influence which, properly directed, would have enabled you to systematize and control general tariffs. The more intelligent railroad men feel, and feel deeply, the arbitrary character of many of their rates. They would welcome the counsels of a body which should act with them to indicate what the country needs and to show the country that the railroads were working for it and not against it. From the days of Albert Fink down to the present time the weight which would have been given to the representatives of such a commission in a tariff conference is overwhelming, the actual influence which they would have had is unbounded. But once let these counselors appear, not as representatives of the public to help the railroads to do right, but as masters set over the railroads to determine where they have done wrong, and the relation of openness and equality essential to all harmonious action becomes impossible.

For these reasons I believe that evil and not good will come of the Hepburn bill. It encourages the Commission to try to do what it cannot do. It relieves that body of the responsibility of doing what it can and ought to do. But whether at this late date it is possible to get a bill passed which will produce any better results is a very doubtful question.

There is no doubt that the conservative element in the Senate would be strong enough to insist upon the insertion of a provision for court review like that which existed in the Esch-Townsend bill. But it is not clear that much would be gained by such a course. The Commission would still think that it was a judicial body. It would make enough doubtful orders regarding rates to prevent it from having any real influence on the railroad management of the country as a whole. If you could give the judicial function to the courts and make it clear to the Commissioners that they were expected to do something else, there would be a very substantial gain, but if you only give some of the judicial functions to the courts and leave the Commissioners to exercise others, the gain is too slight to be worth considering.

Moreover, there are several strong positive reasons why the conservative interests in the Senate ought not to insist on a compromise measure. In the first place, if the railroad men attempt to have the bill modified it will be regarded as a selfish effort to block the wheels of legislation for their own private interest. This is always a blunder. From the standpoint of railroad management alone, the good from preventing the passage of the Hepburn bill would not be nearly as great as the harm which would come from assuming an attitude of factious opposition. The Hepburn bill will not greatly hurt the railroads. If anybody is much harmed by illusory attempts to limit rights of appeal it will be the shippers. Now, this is a free country, and if the shippers are bent upon hurting themselves it may be inexpedient for the railroads to go too far in preventing it. Should the Hepburn bill be passed in substantially the form in which it comes from the House of Representatives there is a fair chance that after a few years of unsatisfactory operation it may be repealed. People may do as they have done in England; confess the failure of one method of legislation and try to devise a better one. But if the compromise measure is adopted, nobody will know who is responsible for the failure. Each party will cast the blame upon the other. Ten years hence we shall see that we have accomplished nothing, but we shall be totally unable to tell whose fault it is. The Interstate Commerce Act illustrates the dangers incident to such a compromise. Being based upon no principle—or, rather, being based on a mixture of two conflicting principles—it was quite impossible for us to draw any sure lessons from its failure or to convince people in which direction it ought to be amended. Unless grave harm is to be done by an experiment it is often better to let the majority try it in their own way, for the sake of fixing the responsibility for the present and enabling our successors to do better in the future.

But apart from any consideration of selfish interests, or any attempt to forecast the future, there are immediate public reasons against factious opposition to any popular measure of regulation of a moderate type. The country is to-day in the midst of a great wave of moral sentiment. This has been aroused by the insurance inquiry, by the evidences of political corruption in cities, and by

various abuses of corporate power which have come to light. If the spirit of reform is allowed to have its own way it will result in a good many wise acts, and some foolish ones also; but the good is pretty sure to outweigh the evil. If, on the other hand, this sentiment is resisted, every case of unintelligent resistance will give rise to deep-seated misunderstandings; will intensify the evils and dangers incident to the movement; will make radicals out of those who should have been conservatives; and will during the next time of commercial crisis leave us face to face with the danger of bitter class struggles.

Of this movement of public sentiment President Roosevelt is the recognized leader. He is a man of such many-sided activity that very few people believe that he is right in everything, but a great majority of the American people have confidence that he is right in general. Therefore if the President to-day approves of a law, there is more than ordinary reason for giving weight to his views. He does not represent himself alone. He does not represent his office alone. He represents a sentiment which under leadership like his is most salutary; but which, should it fall under the direction of other leaders, might readily become hysterical or pernicious. The position of many of the senators and representatives that they will stand for a bill which has the approval of the President and not for one which fails to have his approval, is in my judgment a wise one. And though I cannot concur with the President in believing that the Interstate Commerce Commission is the proper body for judicial determination of rates, I believe that it is better to acquiesce in a measure that he approves than to insist upon a compromise which would not satisfy him or anyone else.

Let us sum up the different elements in the whole situation.

The Hepburn bill does not appear likely to accomplish its object. The history of English railroad regulation shows that a similar measure passed under closely analogous circumstances, failed to do the good which its advocates expected. The same failure is likely to be repeated in the United States, when an act provides that a commission shall be at once an advisory body, a prosecuting body, and a judicial body. The combination of these three functions in one office is repugnant to the Constitution of the United States, to common law, and to the American sense of fair play. And the bill is subject to this further criticism, that by investing the commission with certain judicial duties and powers which it cannot well assume, it incapacitates it for the most important administrative functions which properly belong to it. What the United States needs is an act under which the commission will

bad principles is sometimes better than a law based on no principles at all; and the harm which would come, either to the railroads or to the country as a whole, from the passage of the Hepburn bill or anything at all like it, is a far less serious evil than the spirit of distrust and of class antagonism, which would be aroused by factious opposition.

The Panama Railroad and the Canal.

BY FULLERTON L. WALDO.

When in 1904 the United States bought the canal property from the new French company, there was included in the purchase 5,888



From stereograph by C. L. Chester; Copyright, 1906, by Underwood & Underwood, New York.
West Bank of Culebra Cut, Looking South—Bucyrus Steam Shovel at Work.

of the 7,000 shares which constituted the capital stock of the Panama Railroad. The remaining shares have since been bought for \$155,020. At the time of the transfer, the railroad consisted of a single track of 56-lb. per yard rails, from Colon to Panama, with a gage of 5 ft. In April, 1905, it was decided to double-track the road, and since then the energies of a force of 4,000 laborers have been mainly directed toward that end. The track (still retaining the old, inconvenient 5-ft. gage) has been practically relaid with 70-lb. rail. The roadbed is ballasted with rock and gravel. In connection with the great *crux* of the work—the transportation of excavated material from the Culebra cut to fill the swamps or to be dumped in the sea—some 250 or 300 miles of additional track will have to be laid. Were the canal to be built at sea-level, some 270,000,000 cubic yards of material would have to be transported for distances varying from a few feet to 15 miles.

The Commission has recently ordered—to give only a few items in an invoice of mammoth proportions—61 steam shovels, 1,300 flat cars, 12 rapid unloaders, 22 unloading plows, 13 earth spreaders, 324 dump cars, 12 hoisting engines, 120 locomotives, 5,000 tons of steel rails, 125,000 cross-ties, 12,000 pieces of piling, 14 air-compressing machines, three cranes. The Panama Railroad on its own account has lately purchased 500 40-ton box cars, 12 caboose cars, 10 refrigerator cars, six passenger coaches, 24 locomotives, two wrecking cranes, one locomotive crane, one pile driver, three 100-ton track scales, one wooden coal-hoisting plant, one cantilever crane.

With the 89 steam shovels which will shortly be in operation, it is plain that the resources of the railroad will be taxed to the utmost to remove the spoil from the excavations, in addition to handling the abnormal traffic incident to canal construction. Last October, 12,000 tons of commercial freight had accumulated at the canal termini, while at the same time steamships were forced to depart without their cargoes. The reorganized administration of the railroad cleared up the accumulation in a month's time. Formerly, there had been no system, worthy of the name, in car



From stereograph by C. L. Chester; Copyright, 1906, by Underwood & Underwood, New York.
French Cut for Lock at Bas Obispo—Steam Shovel and Dirt Train at Work.

take part in the making of tariffs and give effect to the public interest in the general questions of railroad management, leaving the specific cases of violation to be stopped or punished by the courts. The arguments, both historical and economic, in favor of a bill to have a commission do its own business instead of relieving it of that duty in order that it may do somebody else's business, are very strong indeed. If, however, these arguments do not carry conviction, and a measure drawn on these lines fails to get the necessary votes, I would not try to compromise. A law based on



From stereograph by C. L. Chester; Copyright, 1906, by Underwood & Underwood, New York.

View in Culebra Cut.



From stereograph by C. L. Chester; Copyright, 1906, by Underwood & Underwood, New York.

Steam Drills at Work in Culebra Cut.



From stereograph by C. L. Chester; Copyright, 1906, by Underwood & Underwood, New York.

Panama Railroad Looking Toward La Boca Along Line of Canal.



From stereograph by C. L. Chester; Copyright, 1906, by Underwood & Underwood, New York.

Entrance to Main Culebra Cut.



From stereograph by C. L. Chester; Copyright, 1906, by Underwood & Underwood, New York.
Bucyrus Steam Shovel (3½ Yards Dip) in Operation—Soft Clay Rock in Foreground—Similar Rock Was Blasted by the French Canal Company.



From stereograph by C. L. Chester; Copyright, 1906, by Underwood & Underwood, New York.
Culebra Cut—Steam Shovels at Work.



From stereograph by C. L. Chester; Copyright, 1906, by Underwood & Underwood, New York.
In Culebra Cut Looking Toward Colon.

thick, to bottom of girder of 2 ft. The center girder is 4 in. wider, however, these respective dimensions being 12 in. and 16 in. For accounting or tracing, but when the first 200 of the 500 cars ordered were gotten into commission, the well-nigh paralyzed freight traffic took a new lease of life.

"The nature of the traffic," says Engineer Stevens, "has complicated the handling of the business of the railroad to such an extent that an extremely low cost of handling can never be arrived at. All of the canal business moves from terminals to interior points, resulting in a very light average through train tonnage and a very large empty-car haul, and these factors, coupled with a heavy grade road and extremely light power, resulting in small train loads and large train mileage, will keep operating expenses high as compared with those of roads operating under more favorable conditions in regard to above as well as with cheaper labor."

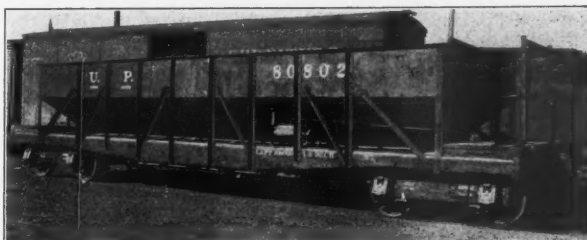
Of course in building the canal the dredge, rather than the steam-shovel on a railroad track, will be used whenever practicable. The service conditions for the steam shovel impose serious difficulties. On rainy days, with wet rails, only four five-yard dump cars per train can be hauled in place of the usual twelve. Derailments are frequent. At Culebra, the clayey material in which the steam shovels are working becomes so sticky that it will not clear itself, but has to be shoveled by hand from the French dump cars. The old Belgian rail (3¾ in. wide at base and 4¾ in. high), in combination with the short spikes (4 in.) and the ties of soft pine without tie-plates, have been the cause of many derailments, and in default of track tools there have been resultant serious delays. Requisitions for tie-plates dated November, 1904, were not filled until June, 1905. "With new track properly ballasted and surfaced," says Acting Chief Engineer Dauchy, "and the installation of new cars, locomotives, Lidgerwood unloaders, bank spreaders, and modern drilling machinery, the establishment of dumps of the proper height and with tracks leading to them, the troubles that we are now having will be largely done away with, and the output of the steam shovels increased to something like their capacity."

Maintenance Economy of All-Steel Cars.

The economy of all-steel equipment is exhibited in a striking way in the accompanying engravings from photographs, for which we are indebted to the courtesy of Mr. Julius Kruttschnitt, Director



Car No. 80802 Before Repairs Were Made.



Car No. 80802 After Repairs Were Made.

of Maintenance and Operation of the Harriman Lines. The views show two Union Pacific ballast cars which had been badly smashed in a wreck, and these same cars after they were put through the Cheyenne shops of the road. Mr. Kruttschnitt says, "Car 80,802 seemed hardly worth picking up, yet \$322 put it in perfect condition. Car 80,793 was not quite as bad, yet if a wooden car had experienced such treatment, the body would have been absolutely worthless; \$300 restored the steel car to its original condition."

Mr. Wallace's Testimony Before the Senate Committee.

The following extracts from the testimony of Mr. John F. Wallace before the Senate Committee on Inter-oceanic Canals, Feb. 5, shows most illuminatingly the false position in which Mr. Wallace was placed by Secretary Taft. The testimony is a dignified and convincing document, and it is most unfortunate that the facts of it could not have been brought earlier to the attention of the American people.

Senator Kittredge.—What were the terms of your employment by the Canal Commission?

Mr. Wallace.—When the Spooner bill was first passed, or about the time it was being considered, quite a number of my friends suggested to me the propriety of going on the original Commission; and I gave it some consideration at one time, and even went so far as to permit them to introduce me to various men that were influential. After further consideration I decided that I did not care to become associated with the work in that capacity and give up my railroad work.

In February of 1904 I was in Washington at a hearing before the Interstate Commerce Commission in regard to some controversy over freight rates, and Mr. Fish, our president, was also here, and at that time he had several conferences with Admiral Walker, and several names were mentioned to me of possible commissioners from the south, and I was asked to state which of the various names presented was preferable for the position, and I did so recommend Major Harrod. After I left Washington I received a letter from Mr. Fish, in which he said that my name had been considered for the position, and he transmitted to me a copy of a letter that he had written to Admiral Walker in regard to it.

In that letter Mr. Fish objected to my becoming connected with the Commission, although he indorsed me for it, if it would interfere with my connection with the Illinois Central Railroad, but he left it to me to decide as to whether I desired my name mentioned in connection with it or not. I thanked him for his kindness and told him that I felt much more gratified at the expression of his good will than I would have been if I had received the Commissionership, and that incident was closed.

In May I received a copy of a letter from William Barclay Parsons, which I would like to read to you—it is very short—as it gives you, in a way, the idea that was in the minds of the Commission as to the scope of the duties of the chief engineer.

This is the letter from Mr. Parsons:

"My Dear Mr. Wallace: On this trip from New York to the



Car No. 80793 Before Repairs Were Made.

Isthmus, the Commission has been giving earnest consideration to the selection of a chief engineer, realizing that a very great measure of our success will depend on that official.

"The man for this position must possess exceptional qualifications. He must not only be an engineer, but must also be an administrator and an executive. He must have mature judgment, and yet energy of accomplishment. He must be well known and favorably known. Among the men who have been considered as so qualified naturally your name occurs, and the Commission desires to know whether, if a tender of this position were made, it would be seriously considered by you.

"Owing to a previous professional engagement with the British Government, I will be obliged to leave Panama in advance of the other members of the Commission and will arrive in New York on April 19, so as to sail for England on April 26. The other members of the Commission and I would very much like to have you and me meet to talk this matter over so that I could communicate with them prior to my leaving for Europe. Would it be possible for you to be in New York some time before the dates mentioned, on, say, the 21st or 22d of April? If you can do this we can discuss the whole thing, and I can give an answer to my associates.

"I can imagine that you will be disinclined to think of severing

your connection with the Illinois Central, but on the other hand you would attach your name to the greatest piece of construction ever undertaken.

"Hoping that you will be able to meet me, I am,
Yours sincerely,

WILLIAM BARCLAY PARSONS."

That was the introduction to the Commission which afterwards resulted in my appointment.

My object in presenting these papers is to show this committee that I did not seek the position, as has been stated publicly on several occasions.

At the close of this letter Mr. Parsons suggests an interview in New York with him in a preliminary way, as he returned to this country a week before the regular Commission did and they delegated him to have a preliminary conference with me.

As I was in New York at the time designated I called on Mr. Parsons, and in an interview stated to him that the question of my giving favorable consideration to the acceptance of the position of chief engineer depended entirely upon terms and conditions. [Reading:] "Mr. Wallace informed Mr. Parsons that if the Commission were willing to give him a free hand in the conduct of the work under the general supervision of the Commission, permit him to select such assistants as he might require, and also give him full control over all details connected with the work, he would be willing to give the matter favorable consideration. Mr. Parsons replied that he had no doubt the Commission would be willing to tender the position subject to the conditions named."

Senator Dryden.—What is that you are reading from now?

Mr. Wallace.—That is just a memorandum that I had to refresh my memory.

Senator Kittredge.—Were the terms agreed to?

Mr. Wallace.—After the Commission came back I was invited to appear before it in Washington, and I came on from Chicago. On Wednesday, May 4, I first appeared before the Commission, and naturally the first question that I asked them was as to the terms and conditions that they were willing to offer me. I wanted their idea as to how they proposed to conduct this work, and, not being able to get any expressions out of them as to the conditions, they asked me to submit to them my ideas of how the work should be conducted, which I did.

Senator Hopkins.—Did you do that in writing or verbally?

Mr. Wallace.—No; that was verbal, entirely. I particularly stated that I could not consent to take the position except on the consideration that I would not take orders from any one individual, or be under the control of the various Commissioners in their individual capacity; that I would be willing to carry out any instructions which the Commission as a body might give me in the conduct of the work; that I imagined that the only benefit that my services could possibly be to the United States Government or to the Commission in that work would be so far as I might have ideas that were original, or so far as the methods which were my methods and the ways which were my ways could be applied to that work to produce results.

If I was simply to take charge of the work and conduct it according to the ordinary governmental methods or to the regulations of governmental departments, and use the methods which had always been used in the conduct of public works, my services would be of no avail at all; that it would be much better to secure some person who was familiar with those methods and was accustomed to those ways. And I was particular to state that what I apprehended more than anything else was that each individual member would have his own ideas about special things, and that I would in a short time be endeavoring to serve seven masters instead of one.

After quite a conference on that subject, the Commission not giving any expression of their ideas except occasionally asking me a question, I bid them good day and withdrew, and I never expected to be called back again. I thought that would settle it, because I felt the necessity of talking so plainly that I did not imagine that the Commission would care to have that kind of a man as their servant; but the next day Admiral Walker called me in and stated to me the salary which they had proposed to pay me. Although it was not the one that I had named in the tentative proposition, I told them that the salary did not cut any figure; that the thing that I was anxious about was the conditions, because I felt that the conditions were those that were prime requisites to obtaining efficient results. He wanted to know if I would accept the position. I asked him if he had conferred with the President, and he said the President understood the situation in a general way. I told him that I would like to reserve my decision until he could personally see the President and inform him of the conditions that I had made. About a week afterwards I received a letter from him in which he said they were satisfactory, and I then accepted an appointment, which was simply a plain letter telling me that I was engaged as chief engineer.

The primary causes which led me to tender my resignation as chief engineer of the Isthmian Canal Commission were underlying and fundamental, and I must emphatically resent the

charge that my motive in leaving the work was a financial one.

A careful consideration of the entire subject had brought me to the decision that I should disconnect myself with the work at the earliest possible date that it could be done without embarrassment to the Administration or injury to the work. It is unnecessary to state the reasons for this decision, except that in fairness I should say that they involve no criticism of any act of the President or the Secretary of War.

My final decision was arrived at as the result of the six days' uninterrupted thought which I was able to give the subject in all its bearings during my voyage from New York to Colon in May. Furthermore, I had pledged myself to my family to give the matter of my resignation as chief engineer, or of any position which would require my continuous residence on the Isthmus, serious consideration.

It was at this psychological moment that I received a cablegram from New York offering me a business opportunity which I was bound to consider. I therefore immediately cabled the Secretary of War requesting a conference and arrived in New York for that purpose on Thursday, June 22.

In the meantime I had addressed a letter to the Secretary in which I confirmed the request for an interview and also requested my annual leave of absence, which was a part of my original understanding with the Isthmian Canal Commission, and which I had requested from Admiral Walker in March to take effect at our mutual convenience some time later in the season, which request, however, was not complied with or answered, owing probably to the sudden change made in the Commission on April 1.

On my arrival in New York I was met by Mr. William Nelson Cromwell, who stated that he was delegated by the Secretary to arrange for a special interview with me, and asked if I would meet him at the Manhattan Hotel at 10 a.m. Sunday, June 25.

While Mr. Cromwell treated me with the suavity and courtesy for which he is noted, he endeavored to draw from me my reasons for desiring to see the Secretary. I told him frankly that I did not consider it would be proper for me to discuss the matter in advance of my interview, and I also requested him to arrange for me with the Secretary that the interview should be absolutely private and that no one but the Secretary and myself should be present.

On arriving at the Manhattan on Sunday I was met by Mr. Cromwell, who ushered me into the Secretary's private apartment, accompanied by my son. Assuming that arrangements had been made for a strictly private interview, my son withdrew, expecting Mr. Cromwell to do the same. However, the Secretary in rather a peremptory manner directed Mr. Cromwell to remain.

This action of course caused irritation and apprehension on my part that the interview would be unpleasant and unsatisfactory; and the irritation under which the Secretary was evidently laboring had a tendency to prevent that calm and dignified consideration of the question in all its bearings which should have been given it.

If the Secretary understood me to say that I had accepted a position in New York, he labored under a misapprehension. I did state to him that I desired to accept one, but under such circumstances and conditions and at such time as would cause the least embarrassment to the Administration and the least injury to the work, and that I was even willing to go to the extent of remaining for an indefinite time on the Commission should he desire my counsel and advice in arranging for the change, assisting in preparing plans for submission to the advisory board of engineers in September, or in the further consideration of the question by the Administration or Congress during its next session.

Much to my surprise he indignantly spurned my suggestion and took the position that I was compelled, under what he called my contract, to remain in charge of the Isthmian Canal, regardless of circumstances or conditions, until the completion of the work, and spoke in such a manner as to outrage my feelings to such an extent that further discussion of the reasons for my action was out of the question.

I did not seek the position of chief engineer of the Isthmian Canal Commission, and, considering my salary as general manager of the Illinois Central Railroad Company and my other sources of earnings, my financial condition was not improved by my acceptance of the position, and it was with the greatest reluctance that I did so.

While it was my own expectation that I should continue my connection with the work, it did not occur to me that I was not free to withdraw if justice to myself and my family and to my reputation as an engineer required me to do so. It was not only my right but my duty to give the matter the most careful consideration in all its bearings, considering not only the general situation as it affected the work, but my family, personal and business relations, and all the various factors entering into the problem, and I could not concede the right to the Secretary of War or anyone to dictate my decision. The only debatable questions were the details as to putting my decision into effect, and while I stated to the Secretary what my desires were, I told him that I was perfectly

willing to conform to his wishes as far as possible as to the time and manner of my withdrawal.

"It was this suggestion to which he chose to refer as a 'dicker.'" To that statement I naturally took exception, particularly as he stated that he did not care for any reports that I might make summarizing and analyzing the results of a year's hard work on the Isthmus; also, that he did not value my counsel and advice, and that the only service he desired was that of a constructing engineer on the Isthmus.

No intimation of friction between the Secretary of War and myself would have become public if it was not accidentally or otherwise given out by the persons in attendance at the conference on Sunday other than myself, and I desire to state emphatically, and the representatives of the press will bear me out, that I have refused absolutely, either directly or indirectly, to be interviewed, and have remained silent under the innuendos which have been daily published since the conference, and would not have made even this statement at this time if it had not been for the severe strictures contained in the published statement of the Secretary, which I consider unjust and uncalled for, and which could serve no useful purpose.

In regard to the situation at Panama, at no time during the progress of the work could my relations have been severed more opportunely than now, and with less damage to the work. A complete organization of departments and bureaus has been effected. Mr. W. E. Dauchy, a gentleman of high engineering attainments, who has been chief engineer of the Chicago, Rock Island & Pacific Railroad Company, and who had occupied the position of division engineer in charge of the Culebra division, was upon my leaving the Isthmus placed in charge of the work as acting chief engineer, he having occupied a similar position during my absence from the Isthmus at the call of the Secretary, during the month of April, and having satisfactorily conducted the work through the demoralization attendant upon the change in organization.

The only work which can be performed until after Congress at its next session shall take some decided action is the gradual increase in the organization and the addition of units of machinery along a well-defined plan which Mr. Dauchy thoroughly understood.

The simple work of excavating at Culebra and preparing for further excavation are the only things which could be done pending a final decision from Congress. The only possible benefit that my personal service as chief engineer could have been to the work was such as might be due to the purely personal element, which would have been largely supplied by my continuance with the work in an advisory capacity. As far as the actual engineering and construction work was concerned Mr. Dauchy was fully as capable as I.

Despite all of the discouragement and obstacles which have surrounded this work (as the Secretary knows and has practically stated in his letter) I endeavored to faithfully and vigorously perform the duties of my office and have never complained or criticized my superiors or any one connected with the work, and, as stated in the Secretary's communication, I have never requested additional emoluments or asked any favors of a personal nature, and, any suggestions which I may have made (as his statement will bear me out) have been made because I considered them necessary for the increased efficiency of the work.

The reorganization of the work in April was not considered ideal, but as it was such a decided improvement over the existing condition of affairs and seemed to be all that could be done under existing laws I gave it my hearty approval.

I have made no criticism of personnel or individuals, but do believe that the obstacles due to the governmental methods required by existing laws are so serious that they will have to be eliminated if the American people are to see the Panama Canal constructed in a reasonable time and at a moderate cost.

My only desire in this statement has been to protest against what I consider the unjust denunciations of the Secretary, and to fully inform my personal friends and professional brethren, who have been familiar with my career, of the essential facts relating to this matter. I emphatically disclaim all responsibility for the various statements recently published alleged to have been made by so-called friends.

In regard to the type of the canal I would prefer to be excused from presenting any opinion until I can have access to the reports of the advisory board and the Isthmian Canal Commission, which, I understand, are divided in their views, and one of which favors one type of canal and the other the other. In other words, I think I can give you better service after having an opportunity to see those views than before.

I made a good many mistakes in my attitude toward that work, mainly for the reason that I was enthusiastic in regard to it. That is, I became so as I studied it, and I felt as if nothing should stand in the way of its success. I felt that the Secretary of War and Mr. Cromwell failed to appreciate the character of work that I was best able to give, and when a new chairman of the Commission was appointed I tried to accept that position; I was very grateful to the Secretary for the change, because I felt that in appointing me on the Commission and on the execu-

tive committee he was trying to shape the work up in a proper way. But later on, and particularly after I had sailed for the Isthmus and gone back there, to my mind there appeared an indication upon the part of the chairman to dominate the entire work and to place me in a secondary position.

Senator Morgan.—Who was the chairman?

Mr. Wallace.—Mr. Shonts; and I felt that I could not give the best service to the work in that position.

Senator Morgan.—Let me interrupt you one moment, recurring now to the question I put to you awhile ago: When you left the Isthmus was it your purpose to ask to be relieved of your duties as chief engineer, turning them over to the successor that you had left there in charge of the work, expecting to remain as a Commissioner for the purpose of advising in respect of this choice of routes and such other matters as might be useful to the construction of the canal?

Mr. Wallace.—That is, if the Secretary of War desired me to do so.

Senator Morgan.—Was it your purpose, then, in leaving there, to disconnect yourself at all events and absolutely from all connection with the Panama Canal construction?

Mr. Wallace.—I do not like to say that it was my absolute purpose; but it was what I desired to do, and I desired to discuss it with the Secretary, and I desired to suggest that course to him.

Now, if you will let me explain, Senator, my position was this: After mature thought in going down there the last time I felt that the relations between myself and Mr. Shonts and between myself and Mr. Cromwell would in a short time arrive at a point where I felt that friction would be engendered which would be detrimental to the success of the work, and would be embarrassing to the Administration; and I did not think that it was fair to let that situation mature. I thought it was better for the work for me to come north and have a plain talk with the Secretary, and if he felt the same way that I did for him to relieve me and to put some man in there (of whom there are a great number in this country) that could work in a subordinate position to Mr. Shonts, and who was willing to be in a position where he would be dictated to and under the control of the work, as Mr. Cromwell was.

Senator Morgan.—When did you first see Mr. Cromwell on the Isthmus?

Mr. Wallace.—He came down there with the Secretary of War, I think it was, in December. Let me have my notes and I will tell you. It was in November, 1904, when the Secretary came down to revise the Bunau-Varilla treaty, or to make an arrangement to modify some of its requirements; and Mr. Cromwell was with him and acted as the go-between between the Secretary and the Panamanian authorities, or at least that is the way it seemed to me.

Senator Morgan.—How long did Mr. Cromwell remain there after that negotiation was closed?

Mr. Wallace.—He returned with the Secretary of War to the United States.

Senator Morgan.—When did he reappear on the Isthmus?

Mr. Wallace.—I never saw him on the Isthmus again.

Senator Morgan.—You never saw him any more?

Mr. Wallace.—No, sir. The next thing that I heard from Mr. Cromwell was in March, when I received a cablegram from him stating that, on his recommendation, the Secretary of War had authorized the directors of the Panama Railroad to elect me general superintendent. The next day, or the same day, I received a cablegram from Mr. Drake, the Vice-President of the Panama Railroad, stating that I had been elected by the board of directors of the Panama Railroad as general superintendent. I immediately wired Admiral Walker, and told him that I did not understand this—that I had no relations whatever with the Panama Railroad, and that I reported to him and should receive any instructions of that kind from him.

I declined to accept the position as general superintendent of the Panama Railroad, for the reason that I did not care to report to Mr. Drake or Mr. Payne, the general manager of that company in New York, and be reporting consequently, practically, to Mr. Cromwell, who was counsel of that company, and who evidently directed all its movements, because it made a divided responsibility. And again, I did not propose, on account of the positions I had held in the railroad service, to accept a position of that kind, where I would have to get instructions from men that had never visited the Isthmus, and who knew less about it than I did.

Senator Morgan.—Did you receive any instructions or directions or advice from him (Mr. Cromwell) in regard to the management of business affairs on the Isthmus?

Mr. Wallace.—Except in this way: In our reorganization of the Panama Railroad he wrote out all the resolutions and apparently directed the conduct of the business that was done by the directors of the Panama Railroad and looked after the whole transaction of the reorganization.

Senator Morgan.—Was that done in New York?

Mr. Wallace.—Yes, sir; that was done in New York.

Senator Morgan.—Then he was factotum?

Mr. Wallace.—Yes, sir.

Senator Morgan.—When you came to New York the last time, for the purpose of conferring with the Secretary of War and of tendering your resignation as chief engineer, and, as I understand, of conferring with him about your resignation as commissioner, did you see Cromwell?

Mr. Wallace.—Yes, sir.

Senator Morgan.—Where did you first see him?

Mr. Wallace.—He came to my hotel, at the Marie Antoinette, in the morning, just as I was first coming down in the morning. I had landed during the night.

Mr. Cromwell called to say that he had been instructed by the Secretary of War to ascertain from Mr. Wallace the reasons for his return to the United States and to discuss the situation with him.

Well, I declined to discuss my reasons for coming up. I told him that I thought it was both my privilege and my duty to talk with the Secretary of War, and the Secretary of War alone, first; that he was the officer to whom I reported under the Executive order that outlined the reorganization. Then he said that he was also delegated by the Secretary to arrange for an interview with me. I told him that I would like that interview to be absolutely private and personal. And he said that he had arranged to hold the interview at the Manhattan Hotel, and if I thought that was not private enough he would arrange it at his house. I told him that I did not desire to go to his house; that I wanted to see the Secretary, and I would see him alone; that the hotel or any place was good enough for me as long as that object could be accomplished.

After he left I immediately communicated with the Secretary of War by wire, reported my arrival, and asked him if the arrangement with Mr. Cromwell was satisfactory, or words to that effect; and he replied that it was. I wanted to know whether Mr. Cromwell really was delegated to make arrangements of that kind.

Senator Morgan.—Did you wire the Secretary here at Washington?

Mr. Wallace.—Yes, sir.

Senator Morgan.—When did he arrive in New York?

Mr. Wallace.—I do not know. I met him Sunday morning at the Manhattan.

Senator Morgan.—Well, was the Secretary alone?

Mr. Wallace.—Mr. Cromwell, when I went into the room, met me at the door. We were in large double parlors, and my son was with me.

Mr. Wallace.—Knowing that the interview was to be a private one, he withdrew. Mr. Cromwell made a pretense of leaving the room, when the Secretary said: "Cromwell, I want you to stay here. I want you to hear all this." And he was directed to remain.

Senator Morgan.—What was the first remark the Secretary made to you?

Mr. Wallace.—He said: "Now, Wallace, go ahead and tell what you came up here for." I do not remember the exact words, but that is my recollection of it now.

Senator Morgan.—Did you proceed to tell him?

Mr. Wallace.—I told him that I had two matters to take up with him, one of a personal nature and the other general. The personal matter concerned my connection with the work as chief engineer, and the general matter concerned the general statement that I wanted to make to him in regard to the work.

Senator Morgan.—Did Cromwell stay while you were discussing both these propositions, the personal and the general one also?

Mr. Wallace.—Yes, sir.

Senator Morgan.—Did you invite him to stay?

Mr. Wallace.—No, sir.

Senator Morgan.—Did you protest against his staying?

Mr. Wallace.—I did not protest, because when I told him freely and went to such an extent in my interview with him, telling him that I wanted the interview to be a private and personal one, I thought that was sufficient. I presume, looking back at it now, that I ought to have remonstrated. But I was impressed with the fact that the Secretary was angry, and that he was suppressing his feelings; and, of course, until my resignation was handed in and accepted, I felt that I was his subordinate, and I did not want to precipitate any unpleasant features in the controversy, which I was impressed was going to be unpleasant anyway, from his attitude. Therefore, I simply let it go along on that basis; but it changed my entire attitude, naturally, from the beginning.

Senator Morgan.—Had anything occurred between you and him, by way of correspondence or otherwise, to provoke him to anger?

Mr. Wallace.—No, sir; not that I know of. I supposed of all men connected with the work in a higher capacity, that the one man I could talk freely to was the Secretary, although I had never had any private conferences with him either personally or about the work since its inception. There had always been other persons present at our conferences. When he was on the Isthmus in December or November, and was down there about ten days, he lived in the house with me, but his time was all taken up with these conferences and various things, and we hardly got out of bed in the morning before Cromwell was at my front door, and generally he was in close conference with the Secretary when I retired at night.

At one time during that stay I requested an interview with the Secretary, in order to explain the work to him, and he finally set an hour and a day; and when we went into my library to have the discussion, I had my papers laid out on the table there, and was about to commence, when he said: "I have told Mr. Carpenter to send for Mr. Cromwell, as I promised Mr. Cromwell that when I had this conference I would have him present." And Mr. Cromwell came into the room.

Senator Morgan.—In what light did you regard Cromwell there—as an adviser of the Secretary, or as a spy?

Mr. Wallace.—Well, it struck me that he had a great deal of influence over the Secretary, and that the Secretary relied on him for advice and counsel in every step that was taken in connection with the work. I felt that to such a degree that my motives toward him were very mixed. I felt very kindly toward him in one way, because I felt that the Secretary could not have made the change in the executive committee, or would not have made it, except on Mr. Cromwell's advice, or at least his concurrence in the Secretary's policy in regard to the matter.

I told him that I desired to resign as chief engineer.

Senator Morgan.—What did he say to that?

Mr. Wallace.—He did not make any reply. He let me go ahead, and I outlined to him what I desired to do, and the methods that I thought would accomplish it with the least injury to the work and the least embarrassment to the administration.

Senator Dryden.—Was that the first intimation that Secretary Taft had of your intention to resign?

Mr. Wallace.—In this cable I had sent him I said: "I desire to confer with you and others in regard to matters which may affect my relations to the work as chief engineer." That was about two weeks before I came up here.

Senator Morgan.—That might affect your relations as chief engineer?

Mr. Wallace.—Yes, sir.

Senator Morgan.—Did you proceed to make to Mr. Taft a statement of the causes why you thought that your resignation as chief engineer might be beneficial to the work?

Mr. Wallace.—No, sir; I did not.

Senator Morgan.—Why?

Mr. Wallace.—I did not give him any reasons whatever.

Senator Morgan.—Why?

Mr. Wallace.—I did not think that his attitude was such that it was wise to take up and discuss those features, and I confined myself simply to telling him what I desired to do; and then when I got through he said, "Now, go ahead and tell us the general matters that you want to talk about." Then I went ahead and discussed the general features of the work there, and Mr. Cromwell commenced to cross-examine me.

Senator Morgan.—Who did?

Mr. Wallace.—Mr. Cromwell.

Senator Morgan.—To cross-examine you?

Mr. Wallace.—Yes; that is, about general conditions.

Senator Morgan.—Yes.

Mr. Wallace.—And concerning several statements I made, one in particular, the Secretary said that he disagreed with me most emphatically; and to my mind it appeared as if there was going to be an attempt made to irritate me into losing my temper, which I tried very hard to control. The examination reminded me a good deal of a cross-examination which a lawyer might make of a witness when he tried to force me to answer yes or no, without proper qualifying explanations. It was like some of the experiences that I have had on the witness stand.

After I made him the general statement, then he cleared his throat and got off that denunciation of me, which was almost word for word what he published through the Associated Press later on.

After the conclusion of that I undertook to argue with him and Mr. Cromwell, and to explain my position and his. I said to them: "You certainly do not take the position that I have not got the right of resignation at all—that I could be in a position where I could be discharged by a cablegram on a moment's notice, and you have the right to change the conditions, and yet I have not the right to resign at any time or under any conditions?" And they first took the ground that that was my position there. Then I said to the Secretary: "Mr. Secretary, I cannot let you nor any other man dictate to me what my rights or what my duties are. I know what they are." And I said: "You and Mr. Cromwell are supposed to be the two smartest, shrewdest lawyers in the United States; and do you mean to sit there and tell me that there can be an implied contract that would bind me to give my service to the United States Government forever, regardless of changed conditions or anything of that sort?"

And after some argument he finally said, "Well, you at least ought to give us a year's notice." I said, "If it comes down to a question of notice, that is a proper thing to discuss, and I am willing to discuss that with you. I do not mean to say that what I have advanced here as my desire is binding on you. I do claim that I have the right of resignation, and that I want to resign as chief engineer, but I am willing to discuss the matter with you in

all its phases." Then he turned around and said, "Well, I will not stoop to dicker with you." He said, "That would be to dicker." Then one thing led to another, until finally the conference was broken up.

When I got up to withdraw from the room I told him that I would, as soon as possible after I had composed myself, send my resignation to the President through him, as Secretary of War, subject to the President's acceptance at his own pleasure and convenience.

Senator Morgan.—Did you send in your resignation?

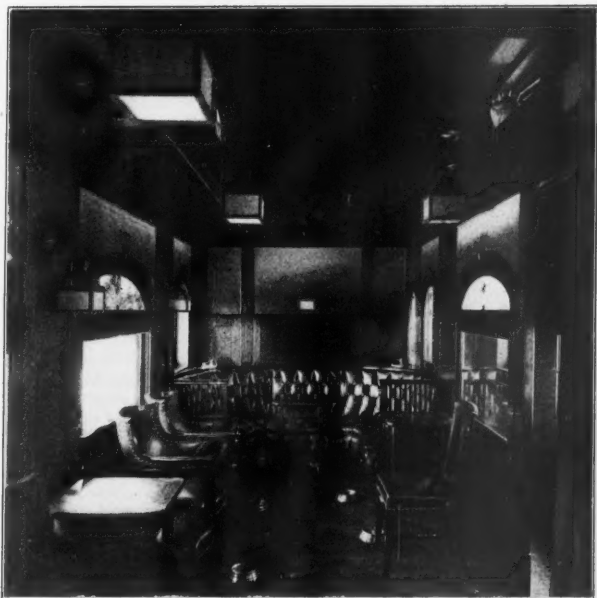
Mr. Wallace.—I sent it in that way.

Senator Morgan.—What offices did you include in that resignation?

Mr. Wallace.—I included the office of Isthmian Canal Commissioner and chief engineer, and made their acceptance subject to the acceptance of the President, at his pleasure and at his convenience.

When I left after that interview I never dreamed for a moment but that I would be called to another one before the matter was finally terminated or that the Secretary would say: "Well, Wallace, you and I seem to have misunderstood each other. Let us take this matter up to the President and discuss it with him." But my resignation was accepted, and that incident was closed, except that the next morning after the interview occurred, all sorts of articles came out in the newspapers criticising me, and on the following Friday morning what I understood was the authorized statement of the Secretary was given to the Associated Press.

I may have been wrong in it, but I supposed an inti-



Interior of Smoking Compartment, Burlington Cafe Car.

mation of the offer I had received would be more acceptable to him than any other reason that I could give him, on account of Mr. Morton's having laid down his duties as Secretary of the Navy and accepted a more lucrative position, and Mr. Day's having laid down his duties in the prosecution of the trusts, and things of that sort, and that seemed to "go" satisfactorily. I may have been wrong in intimating anything like that.

I want to say right here, however, that I had not accepted that position then and that I have not accepted it since; and that before I had the interview with the Secretary, I told the parties that had made the proposition to me that, while their proposition was satisfactory in a way, I did not propose to go any further with them until I could find out whether or not I could make a satisfactory arrangement with the Secretary of War to accept my resignation and to make some arrangement by which my leaving would not endanger the work or embarrass the Administration.

Senator Morgan.—If I catch your meaning, and I think I do, part of your office up here was to shake Mr. Cromwell off your shoulders?

Mr. Wallace.—Yes, sir; you have caught the meaning.

Mr. Wallace.—I suggested that he may be perfectly harmless, but it struck me that from his relation to the work, as being the man that brought about the sale of the Panama Canal, that assisted in the Panama revolution, that acted as fiscal agent of the Panama Government in making its investments, that is carried on the Panama diplomatic list as one of its members, is a director in the Panama Railroad, an advisor to the Secretary, a stockholder in a public utility company that was on the Isthmus. I felt that a man

that was mixed in so many things was liable to have his ideas perverted, and might some time or other advise the wrong thing, or do the wrong thing, which, if the executive committee that controlled the Isthmian Canal should follow his advice and follow his instructions, might possibly lead to scandal.

Senator Morgan.—I take it from what you say that your apprehension of his capacity for doing dangerous things consisted mostly in the fact that he was on the make and had good opportunities on the Isthmus to make money out of the Government?

Mr. Wallace.—One of the things that struck me most peculiarly about it was that when I got into the Panama Railroad office I was looking over their reports and I found that the last year that the Panama Railroad was owned by the French company, which owned 99 per cent. of its stock, they declared a dividend of over \$100,000 more than they had earned; and that after the declaration of that dividend they sold bonds in their treasury to make ordinary repairs or rebuild their steamships, which should have been rebuilt out of the earnings of the company; and it looked to me as if for counsel to advise that proceeding (which to my mind was practically taking that much money that belonged to the United States Government and putting it into the pockets of the holders—I mean, of the owners of the New Panama Canal Company) bordered on the line of "high finance."

New Dining and Cafe-Smoking Cars for the Burlington.

The Burlington has placed in service on certain of its limited trains out of Chicago new dining and café-smoking cars, built by the Pullman Company. The dining cars have some new features of interior design and arrangement. A photograph of the interior is reproduced, from which it will be seen that the model for the



Interior of Burlington Dining Car.

arrangement and furnishings is the Vienna rooms of high-class German restaurants. A plate rack encircles the car, on which are specimens of ancient ware and steins. A new feature is the provision at each end of a small private dining room with two tables, one seating four and the other two persons. The seats are high and stationary, being built into the car, and are upholstered in leather harmonizing with the woodwork.

The interior of the car is finished in English oak and an interesting story is told regarding the trees from which the lumber was obtained. They grew on the ancient English estate of Rockingham Park and were centuries old. A short time ago it became necessary to sacrifice some of them and 27 were sold to the Pullman Company. The particular oak which furnished material for the Burlington dining cars was nearly 8 ft. in diameter. In cutting it up a gate-hook was found within 10 in. of the center, apparently driven there 700 or 800 years ago. In the same tree was discovered a slug bullet, such as was used in the first matchlocks. From its position in the tree it must have been there since about the time of Cromwell. There was also found a flattened musket ball that had been driven into the tree some time in the early part of the last century. The ball had penetrated the tree about 3 in., and 6 in. of wood had since grown over the place where it entered.

The buffet of the café-smoking car is also shown. It has room for 18 persons, and the café has room for 12. The dining cars seat 30 persons—18 in the main room and six in each private room. The dining cars are lighted by electricity from an axle generating system, and have an acetylene gas plant for an auxiliary. The café-smoking cars are lighted by acetylene.

Accidents Due to Defective Equipment and Carelessness.*

During the last two years we have had an epidemic of accidents caused by defective grate-shaking rigging and defective shoveling sheets on engines, especially of the former. A few years ago they were practically unknown. Now they come so often as to create no remark. The following cases will demonstrate the necessity either of some different apparatus for shaking grates of engines, of greater care in using the apparatus, or of some better method of inspection and repair:

A. G. Kenly, fireman, injured near Windermere; caused by the shovel which he was using catching on the shoveling sheet of engine No. 418.

James Cooney, fireman, injured June 19, in Caster yard, was shaking grates on engine No. 917, and connecting rod brake, catching his hand between shaker rod and quadrant.

H. D. Porter, fireman, injured near Mansfield, May 10; caused by grate rod breaking as he was shaking the grates on engine No. 1280.

Next we come to a class of accidents which is also on the increase and which is of comparatively recent origin, and which I believe could and should be absolutely prevented by the exercise of a little mechanical ingenuity or which, even under present conditions of engine construction, would be avoided by greater care on the part of the engineman. And some day when an injector breaks or a blow-off cock is opened as McGrath or Kennedy or some other mechanical superintendent is passing an engine, and their legs are scalded, I will bet my next month's salary against an 1899 bird nest that they will find a way to prevent such injuries, which are as painful as they are unnecessary and expensive, either by putting the blow-off cocks and injectors under or on top of the engines, instead of having them project from the side.

W. P. Willard, engineman, injured July 22, 4 miles west of Janesville; injector pipe on engine No. 4618 broke, and Willard was scalded about face and head.

Henry Jennings, conductor, injured Oct. 1, at 5:55 p. m., north of Rathburn; was walking by engine in charge of Engineman L. J. Hosmer, who started the injector and threw hot water on Jennings.

Edward Sterns, night engine inspector, injured at Granby roundhouse, Jan. 12, at 8:45 p. m.; he told engine despatcher to open valve to see if sand was running properly; despatcher opened the blow-off cock instead of sand valve, and steam and hot water scalded Sterns' right hand and leg.

We have every year a number of accidents to employees caused by defects in engines and appliances furnished enginemen, nearly all of which could and should be avoided if we had more thorough inspection, greater care taken in repairs and, what is just as necessary, more care taken by enginemen in reporting defects; and when you report defects, and repairs are not made, call the attention of your master mechanic or division roundhouse foreman to the matter and I doubt not that not only will the defects be repaired but greater pains will be taken in the future to see that your engine is kept in good condition.

William Curbin, stripper, injured at Elmwood shops on the 10th of March, was taking boiler front off engine No. 3461; removed all bolts except one, and while waiting for crane to be attached to the door to lift it away, the door fell on Curbin's leg, who was standing on the pilot beam of engine. Investigation showed that the bolt, which had not been removed, and which had been left to hold door, was a "dummy."

G. M. Cramer, fireman, injured, Sept. 9, at Huntingdon, was climbing up on cab of engine No. 784, to get coal chute down, when brake released, and on account of leaky throttle, engine started back, and caught his leg between cab of engine and chute.

J. B. Olsen, fireman, overcome by heat on engine No. 941; caused by absence of lagging on side of engine.

M. H. Woodrow, engineman, and Douglas Evans, fireman, injured half mile east of Peverly, June 19, caused by whistle valve on engine No. 2605 becoming stuck, they being unable to fix it, and they were almost deafened by the continuous whistling. Whistle had been reported on the trip before by the engineman, but was not repaired.

Henry Winterson, a boiler washer, injured on May 15, at Kendrick, was using a 4-ft. nozzle to wash out boiler of an engine, when the collar of nozzle came off, and he was thrown against cab of engine, injuring his back.

The thought has often occurred to me that if the master mechanic or some one other than the foreman, whose duty it is to inspect and repair, would check up the work slips form No. 141 and inspection records to see that the repairs called for on them were made, we would not have so many engine failures or accidents of this kind.

Before leaving the question of engines I want to say a few words about accidents caused by the breaking of lubricator glasses and water gages; they grow more frequent every year and until somebody invents something to take the place of glass, which will not burst, as you value your eyesight, which becomes more necessary every day as the number, speed of trains, and signals increase, carry the shields, which the company had provided for your, not its, protection, over the glass, and not in your seat box as many enginemen do now, and then when the glass breaks, and no one can tell when it will do so, there is little danger of your vision being impaired or lost by your eyes being struck by flying particles of glass.

Accidents caused by use of defective derricks, scaffolds, and the

careless handling of derricks being comparatively new are one of the recent surprises in the business, and I venture to say that this company has paid out during the last 18 months in the investigation and settlement of accidents caused by defective scaffolds enough money, not only to furnish for the system the most approved scaffold now known, but to nickel plate them as well. The following cases will show what is going on in this way:

R. B. Babcock, bridgeman, injured at Ferncliff, a mile and a half north of Whiteston, Jan. 14, while standing near derrick mast, which was being raised and put in position on abutment; the mast suddenly slipped, and knocked this man off the abutment to concrete foundation 34 ft. below, breaking his leg in two places and his arm, and bruising his hip.

H. R. Roberts, bridgeman, killed near Red Creek, March 4, at 11 a. m.; derrick car was being taken from side track to bridge No. 75, and in rounding a curve an attempt was made to swing the boom of derrick to outside of curve, but it suddenly swung over to the other side of car and tipped the derrick car over; Roberts was standing on front end of car and jumped, falling back onto the track, and the derrick tender, which did not leave the track, ran over him. A 2x4 cleat, nailed on side of mast to hold sling-lines in place came off, allowing ropes, which control swinging of boom, to slacken so that movement of boom could not be controlled.

B. H. Jackson, seriously injured at Leicester, Dec. 30; caused by the plank on which he was standing, used for scaffolding, slipping out of the hooks, on account of its being covered with ice and snow, and allowing him to fall 15 ft. to the ground.

Within the last few years accidents caused by defective jacks and drop cables, which, when I commenced to investigate claims, were unknown, have become very frequent. I mention the following to show what they are. All of them would have been prevented by proper inspection—not by inspections made to find things O. K., but by inspections made to find defects; and if not made for that purpose, we had better discontinue them altogether.

L. M. Lumpkins, section foreman, injured Feb. 20, at Graves; he was helping car repairer, and had jacked up a car in order to move the trucks, but when ready to let the car down the jack would not work, and all at once gave way, and Lumpkins was struck on the head by the lever and knocked down, injuring him.

R. J. Hopkins, laborer, injured June 22, at Osazi, was giving signals to have train, loaded with ties, moved, when cable broke and hit him in the face.

In the same category, while perhaps not of the same class, come accidents at coal chutes and water tanks, roundhouses, stations, and other places. Had inspectors, repairmen and employees using the appliances, done as they would have done if the loss occasioned by neglect was to be theirs, none of the following accidents would have happened:

Will Flanagan, cinder pitman, injured May 21, at Cranby shops, was raising cinder bucket with hoist; chain broke, and the bucket fell on his foot.

Frank Hogan, fireman, injured in Colby yard, March 16; had just finished coaling engine No. 875, and pushed up lever to shut off the coal, when the pulley, over which cable works, dropped and struck him on the head.

W. R. Brady, fireman, injured at Quarton, June 1; was standing on tank of engine to take water; rope was frozen and coiled up and he could not reach it; got the ash hoe and caught the rope and pulled the spout down; when it was part way down it fell and struck Brady in the back.

D. W. Dalmann, operator and leverman, injured Aug. 12, at Hampton; was in interlocking plant throwing distant signal, when chain connecting lever with counterbalance weight broke and he was thrown to the floor.

Stanley Lord, freight brakeman, injured at Rembrandt, May 20; was unloading freight from a car; the skid which was being used was broken off at one end, causing it to slip, and allowing Lord and the boxes to fall to the ground, injuring Lord.

Another class of accidents which might also be avoided is that caused by defective floors and platforms in roundhouses and at stations, the failure to keep tools in repair, lack of light, and failure to properly secure lights on switches. While, fortunately, they are not so great in number, yet they go to swell the total, as well as the expense, and ought to be cut out, as they could be with proper care and supervision.

L. N. Corbey, brakeman, injured at Calton, Nov. 28; went into coal shed to get coal for caboose. In coming out he stepped on a broken board in the floor of coal shed and sprained his left knee and left hand.

H. L. Minturn, injured at Acworth, Jan. 16, while running to throw a switch, he ran into a three-throw switch upon which there was no light.

Jacob Paley, boiler-maker helper, injured July 11, at Hinsdale; was striking punch, knocking out rivet; the punch came off the handle and struck him in the eye.

A. D. Yarrow, injured April 3, at Alberon, while throwing switch near roundhouse, the switch light fell and struck him on the head.

Albert Kaufmann, machinist helper, injured July 6, at Hamburg; was in roundhouse working near dynamo belt, which became unlaced and loose end of belt came round and struck him on the left arm.

Next in order, I wish to call your attention to accidents caused by overhead obstructions, drawbars, lumber poles, cinders, and other obstructions being left too near the rail, holes and trenches left uncovered, and failure to block guard-rails and frogs, etc. Everybody is or should be familiar with Rules 617 and 619, which require blocking of frogs and guard-rails and a clear space of 6 ft. from the rail, and yet one would sometimes think from the appearance of some yards, side tracks and switches that the rules, like the midnight closing ordinance, were dead letters. It, however, is the intention and desire of the management that they, like all other rules, should be enforced, and no one is so much interested in that enforcement as the train and yard men, who

*From a paper prepared by the Claim Department of the A. B. & C. Railroad, parts of which appeared in the *Railroad Gazette* of Dec. 15, Jan. 5 and Feb. 23.

work in the yards and on side tracks and switches. If they had been observed, or if their non-observance had been reported by the men who must have known of their violation, none of the following accidents would have occurred:

P. B. Montgomery, brakeman, fatally injured at Mason, while attempting to uncouple car G., P. & A. No. 593 from O., M. & C. No. 1783; chain on pin being broken; blocking gone from guard-rail.

John Lenahan, Switchman, killed at Juniper, June 4; footboard of switch engine on which he was riding struck a telephone pole lying in the grass alongside the track, throwing Lenahan under the engine.

P. D. Kendrick, brakeman, injured at Bentley, Jan. 5, 7:00 p. m.; was riding on the side of a box car, when he was struck by a spike sticking in a board, which was part of the fence around the cellar which was being excavated for the new depot at Bentley. It was necessary to amputate two fingers of Kendrick's right hand and his right shoulder blade was also very bad scalp wound.

Peter Alton, brakeman, was climbing up the side of A., B. & C. car No. 2843, at Hackley, when he was struck and knocked off the car by a high-way crossing sign at that place, and so badly injured that it was necessary to amputate both his legs below the knee, and his right shoulder blade was also broken. This crossing sign cleared this car only 2 ft.

K. G. Purdy, switchman, killed in Walton yards, Dec. 10; caused by his being knocked off the top of a car by the Avery Street viaduct and run over and killed.

I want to call especial attention to the Alton, Montgomery, Purdy and Kendrick cases. In the former the crossing sign had been in the same place for over 20 years. The man who put it there, roadmasters, and section foremen, who should have discovered its dangerous proximity to the track and moved it to a safe distance, the one required by Rule 619, were grossly careless, and the injured man and other trainmen who had passed it daily for years must have discovered that it was too close to the track, and if they had reported it, as they should have done, this accident would not have happened, and they were blamable for not doing so. In the Montgomery case the section foreman was at fault for not properly blocking the frog, the roadmaster for not seeing it was done, and the car inspector and repairer for not discovering that the coupling apparatus was defective and repairing it. In the Purdy case the management was at fault for not seeing that warning whips were up for the viaduct—they are now; and in the Kendrick case the man who hung up the lamp too close to the track to warn people, instead of making it a protection, increased the danger, and the division engineer who allowed it to be done were inexcusably careless. Such cases not only swell the total number, but account in a measure for the total increase in personal injury cases.

Section foremen do not seem to realize the importance of examining the whip guards for overhead obstructions every time they pass them to see that they are in proper position and if not, pull them down with the hook provided for that purpose. If the roadmasters would be more particular to see that this is done we would have fewer accidents of this kind in the future.

And in removing hand cars in yards, place them far enough away from the rails so that a man riding on the side of a freight car won't be struck by them, as happened to

A. T. Swanson, brakeman, injured at Tracy, Aug. 30; he was hanging on the side of a car, and was struck by the handle of a hand car, which had been left too near to clear a man on a car.

I shall next call your attention to accidents caused by carelessness of enginemen which you will, I believe, agree with me in thinking should not have happened and by proper care and thoughtfulness will not occur in the future:

George Bowman, engineman, killed at Holstein, on Sept. 9; caused by engine running off the track, this being the end of the road, and the first time Bowman or any of the crew on the train, other than one brakeman, had been over the line. A section foreman, who was sent along as pilot, claims to have told Bowman when he came to the Y, north of the depot, but Bowman paid no attention to the warning, and made no effort to stop. This engineman had been on duty for 14 hours when he got to Creever, at about 12 o'clock midnight, and asked for 8 hours' sleep, but was sent out again in four hours and a half.

Michael O'Neill, turn-table man, injured Oct. 17, at Patten; he was pushing turntable with engine on it, and while doing so engine ran off before he got to the stall where it was to go in; struck him on left shoulder.

Ralph Burnham, rear brakeman, train No. 55, seriously injured at Bradley, night of Dec. 21, by being caught between the tender of engine No. 641 and the mail car. This man was standing on the east side of track and started to cross over to the west side to help couple the air, steam hose and whistle. He knew the engine was coming back, but owing to the amount of steam escaping from it did not realize it was so close, and before he could get over was caught. The steam was escaping from the steam hose at the back of the tender. It is customary for some engineers to have this steam blowing off as they are backing up to make couplings; others shut off the steam, as when it is blowing off it is almost impossible for the brakeman to see. Why should not all enginemen shut it off?

In a double-track district, if you are running on the wrong track and there are any section men working on the track or employees or others walking or running on the track, you should act upon the theory that even if they know you are coming they will think you are on the track usually occupied, and until you know that they understand the conditions you must be prepared to stop in time to prevent injuring them. And if two trains are passing

on the double track and there is anyone around, don't let it be your fault that an injury occurs because ample warning was not given of the approach of two trains instead of one.

John Cooper, section laborer, struck and killed by engine No. 1564, hauling train No. 21, April 16, at 9:00 a. m., 1½ miles north of Steuben, while working on the track, cleaning the crossing. Train No. 21 was running on south-bound track. Although running on the wrong track, engineman is unable to say whether or not he whistled for the crossing. No one on the engine saw the man.

Injuries caused by the moving of cars being iced or on or under which men are working seem to me of a class so inexcusable as to merit the discharge of the party at fault. Think how you would feel if you or your boy was under, on, or in, a car with a flag out and someone moved the car without notice and you or he was run over. The following are a few such cases:

Philip Elder, car cleaner, injured at Armstrong, July 5; caused by train being moved by switch engine while he was on the ladder filling the water cooler.

Patrick Connelly, car repairer, injured Nov. 29, at Falesburg, was under end of car on repair track; Switchman Moody backed train No. 27 on No. 5 track, and cars did not clear coach No. 368; it struck the car under which Connelly was working, moving it about 10 ft. and dragging Connelly, who caught hold of brake beam.

A. F. Brown, car cleaner, injured at Perryville yards, May 3, at 10:00 a. m., was working in smoker No. 762; engine No. 37 coupled onto the car and pushed it down track and it collided with some other cars, knocking this woman down. No switchman riding on the car at the time of the accident.

Injuries caused by carelessness in throwing switches and derails we all know ought not to occur, and yet they are of frequent occurrence. The following are samples:

G. M. Clancy, engineman; Alfred Dolan, fireman; injured about 10 a. m., June 4, at Peronia; after going in on side track to get some cars, got signal from Brakeman B. Loomis to come ahead. Loomis failed to throw derailing switch, and while going to main line engine left the track, went down embankment, and turned over.

Richard Jones, brakeman, injured May 7, at Nelson. Foreman Brinson told him to cut off two cars and ride them out onto main line, and after he had started the foreman noticed an engine coming up the main line, and threw switch for side track, the cars collided and he was thrown down in car.

Accidents caused by kicking caboose cars in which men are resting are of altogether too frequent occurrence, and are as inexcusable as they are frequent. Rule No. 341 should, I think, prohibit the practice, as it does that of moving cars containing passengers unless coupled to the engine and air-brakes in use. Had this been done, the following cases would not have happened:

K. M. Simpson, brakeman, injured Dec. 12, at Albion, was in way-car cleaning ashes out of stove, when the way-car was struck by another car kicked into it by switchman, throwing him against end of car.

Paul O'Connor, and E. Putnam, brakemen, injured Feb. 22, at Dod-worths, were asleep in caboose No. 1473, on caboose track. Switch engine No. 634, Foreman L. Sherry, went in and got caboose and kicked it out on lead. It did not clear the switch track, and as other cars were kicked back on caboose track it was struck by caboose No. 1289, throwing these men to the floor.

Indeed, I believe that if the practice of kicking freight cars in yards and at stations was prohibited the saving in the cost of repairs to equipment and for damage to contents of cars would be much greater than the increase in pay-roll caused by necessary increase in the number of men in the crews.

Speaking of accidents of this kind brings to mind those resulting from careless handling of boarding cars, which are now so common during the summer season at all points on the system. You all know the class of people who inhabit boarding cars, how little they appreciate the danger, that they are on the sides, top, under, and in the cars. So handle them, not as some brakemen do egg cases, but carefully; never move the cars without going to see that no one is under them cooking his dinner, that the occupants of cars are all in a place of safety, and never make a fly or kick with them, always have the engine coupled up, and don't uncouple it until the car has got to the place it is to be left. Roadmasters and foremen should see that the opening for ingress and egress from the cars is on the side away from the traffic. The switch to the track on which the cars stand should be locked and the key in the foreman's pocket, or else a rail taken up so that no one can get in on the track without notice. If you run across any cases where this is not done, report them before, not after, someone is hurt.

Before leaving the subject of injuries to employees caused by the carelessness of other employees, I want to mention some motor and hand-car accidents and injuries to section men caused by the use of defective cars, by fast running, overloading, and by failure to comply with the rules. Why men on motor cars and hand cars coming in from work want to run faster than is safe (they never do it on the way out), why they should overload, use defective cars, run closer together than 300 ft., be out after dark without a light, leave their cars on the highways to obstruct the same and frighten horses, contrary to Rules 841, 842, and 843, we may perhaps guess. And yet we can see no good reason for failure to comply with the rules which are made for their own protection,

as well as that of the company, and if more careful instructions were given them by the roadmasters and more careful supervision exercised, many of the accidents mentioned below would not have happened. And on account of the class of men now employed on the track, such instruction and supervision is more necessary than ever, as the records show that we have many more such cases in proportion to the mileage and business than we did a few years ago.

G. Botticelli, laborer, injured March 23, about 14 miles south of Yerkessville, was riding on the front end of hand car, which was being followed by another hand car; section foreman signaled to the rear car not to come too close to first car, signal was not heeded and the second car ran into the first, derailing it.

H. P. Dennis, laborer, injured May 28, $3\frac{1}{2}$ miles west of Orion; caused by the handle of a hand car breaking. He says the foreman was not at the brake.

N. R. Forbes, injured near Larkin, June 24, with four other men, was riding on a hand car going home from work. While going down grade, trying to get to station before train pulled out, car jumped track, all the men were thrown off, and Forbes injured. It is claimed by Forbes that injury was occasioned by reason of hand car being out of order and track out of gauge.

In passing over highway crossings, especially in cities and in running past stations, hand and motor cars should be so run that the man in charge could stop the car in its own length.

The Hayden Mechanical Stoker.

Without really expressing an individual willingness to assist in the development, there has been expressed a desire on the part of the mechanical officers of the railroads of the country for a stoker that would lighten the labors of the firemen on the large locomotives, now so extensively used. This expression has naturally led to attempts to produce a machine that will do the work; and among the latest to be tried with success is one built by the N. L. Hayden Manufacturing Co., of Columbus, Ohio.

This stoker performs all of the functions of taking the coal from the tender, dividing it into small portions and distributing it in the firebox. For this there is, first, a heavy grating placed just in front of the coal gates on the floor of the tender beneath which the horizontal section of a coal conveyor is made to travel. Coal dropping through this grating is taken by the conveyor and carried up on one side and thence back to the center, where it drops into the tube of a screw conveyor, by which it is carried forward to a point just back of the boiler head, where it drops into a hopper. The bottom of this hopper is closed by a valve which is capable of turning through a half of a revolution and receiving a charge of coal, when its opening is uppermost. The half turn drops the coal on a shelf in front of the firebox, whence it is blown by steam jets to the various parts of the firebox with an even distribution. The rate of feeding can be varied to suit the exigencies of the work that the locomotive has to do and the quality of the coal that is to be used.

This much for the general principles of the device. Turning to the details of the mechanism, the first point to be considered is the receiving grate. This is a heavy casting with openings of about 4 in. by 3 in. that lies in the floor immediately in front of the coal grates. Beneath there is a conveyor passage through

the speed is reduced to that suitable for the work. These engines are simple reciprocating machines similar to those used for the stoker valve, as will be described later. The delivery end of the screw conveyor is well up over the hopper and has ample opportunity to move with the variations of the relative motions of the engine and tender, and yet always be in such a position as to drop the coal into the hopper.

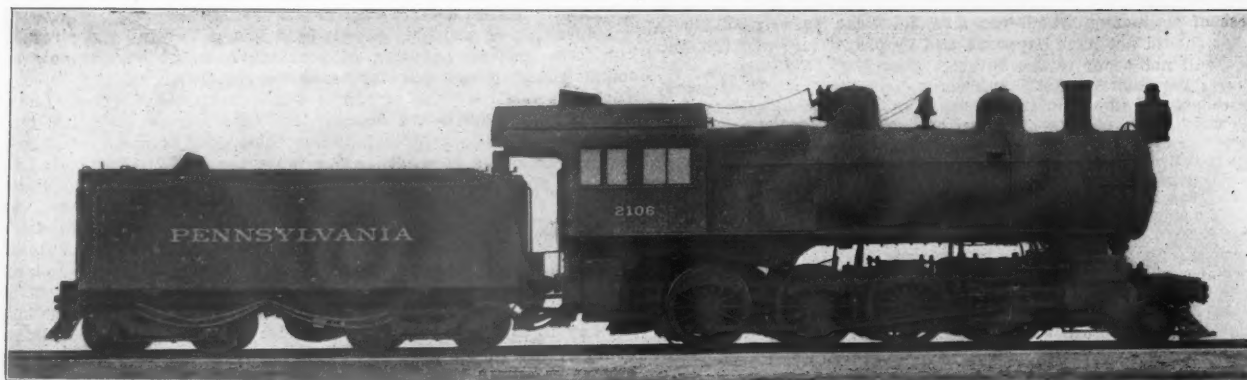
The hopper into which the coal drops from the screw conveyor has an upper opening of about 18 in. by 34 in., and tapers down



View of Stoker as Applied to H-6-A Pennsylvania Locomotive.

to one of 6 in. by 10 in. at the bottom. As the depth is about 21 in. the storage capacity at this point is $3\frac{1}{2}$ cu. ft., or about 175 lbs.

The charging valve is located beneath the hopper. It is in the form of a hollow shell, as shown in the illustration, and will hold about 12 lbs. The coal drops into it when the opening is uppermost. It turns on trunnions that are centered in the main casting and which are fitted with spur gears at the outer ends. These gears mesh with a couple of racks that are directly connected to the



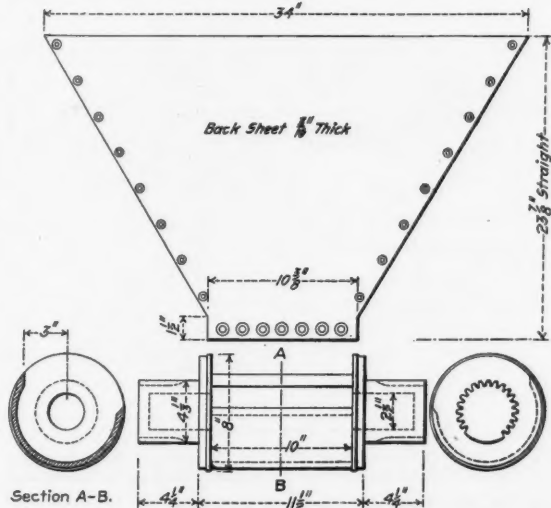
Pennsylvania Locomotive Class H-6-A.

which buckets are driven by an endless chain. The coal dropping down through the grates is caught by these buckets and carried up one of the legs of the conveyor and then back to the center, where it drops into the tube of a screw conveyor, by which it is carried to the hopper on the back head of the boiler. This tube is raised above the foot plate so as to afford ample head room beneath it, and is carried by an angle arch springing from the front of the legs of the tank and the cross piece of the conveyor. There is thus no physical connection between the conveyor on the tank and the stoker on the boiler. The conveyor is driven by its own engine, consisting of two 4-in. by 4-in. cylinders driving a worm by which

piston rods coming from the two operating cylinders AA placed above the door and partially back of the hopper on either side. As the pistons of these two cylinders move up and down the motion is communicated to the rack and by them to the valve, which is turned through a half revolution for each full stroke. The steam admission and exhaust for these two cylinders is regulated by a special valve, which is, in turn, driven by a small two-cylinder engine.

Starting with this source of power, the engine used to drive the valve of the distributing cylinders is of the two-cylinder type without eccentrics or pivoted connections. The cylinders have a

bore of $1\frac{1}{2}$ in. with $1\frac{1}{2}$ in. stroke of pistons. The latter are packed with two small spring rings and are solid with their rods which are screwed into the Scotch yokes by which the rotary motion is given to the shaft. Each yoke also serves as a point of attachment for the valve stem of the mating cylinder, so that the cranks form the eccentrics for the valve motion. As these cranks are set at right angles with each other, when considered as eccentrics, one leads the crank, the valve of whose cylinder it controls; while



Hopper and Coal Valve for Hayden Mechanical Stoker.

the other follows it. The valves are, therefore, arranged for an outside and inside admission respectively; but, owing to the position of the cranks, can have no lap or lead and therefore admit steam for the full length of the stroke.

In the case of the outside admission valve, steam is admitted to the upper end of the steam chest and passes down through the center of the valve to the other end, where it leaves by the side opening at B to enter the space beneath the valve and be admitted

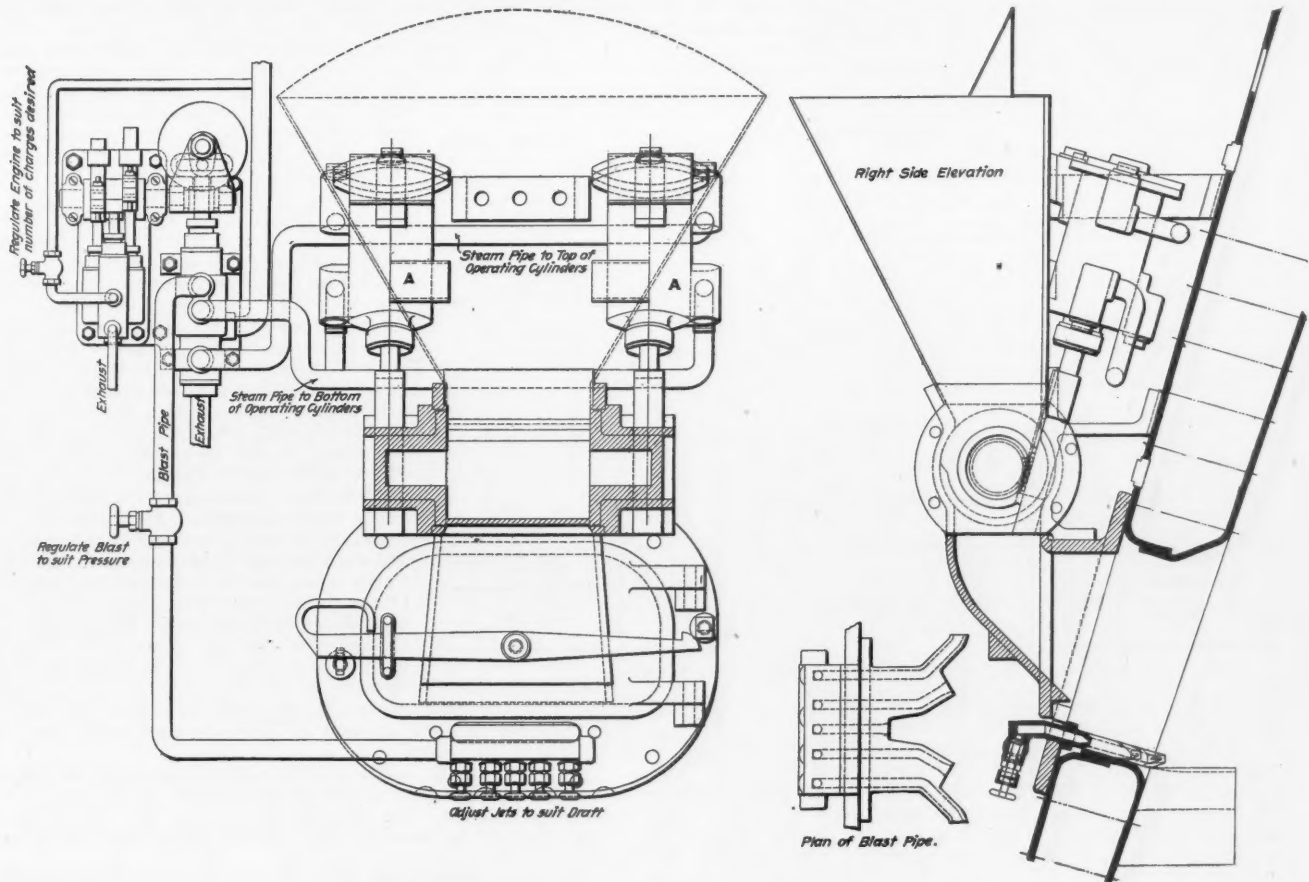
to the cylinder through the port C when the valve has risen sufficiently to uncover it. For the exhaust of this cylinder the valve acts as an ordinary D valve.

In the case of the other cylinder the flow of steam, with the valve of inside admission, is reversed. Steam is admitted to the center of the valve, and exhausted direct at the upper end; while, at the lower end, it passes to the center of the valve through the side opening D, and thence to the upper end and the exhaust. The Scotch yokes are held in alinement by stems projecting downward in the usual way. These engines are very compact and measure but $17\frac{1}{4}$ in. by 7 in. by 7 in. over all. The shaft carries a worm at one end meshing with a gear of 72 teeth, on whose shaft is a crank driving another Scotch yoke that is attached to the stem of the distributing valve of the operating cylinders AA.

Before taking up the operation of this valve attention is called to the three functions that it must perform. It must admit steam to the two ends of the operating cylinders and exhaust it from the same. It must also admit steam to the steam jets for the propulsion of the coal at the proper instant as it would be wasteful and inadvisable to keep the jets open and blowing all of the time.

The illustration shows the method of action very clearly. Starting with the left-hand figure and the crank at the upper point the valve is at the extreme of its travel; and, as it is of the inside admission type, steam is flowing out to the top of the operating or distributing cylinders by which their pistons are forced down and the coal valve turned to dump on the receiving plate at the door. This port, which started to open when the crank was 45 deg. from the central position on the approaching side at R, is held open through a quarter revolution or until the crank has reached E. On passing this point the port is opened to the exhaust and almost immediately the one leading to the bottom of the operating cylinder is opened to the steam and the pistons returned to their upper position with the coal valve set to receive a fresh charge. While the piston is down the valve dumps its contents upon the fuel plate, and then, as the crank turns on, the valve is drawn down still lower until, just before reaching the lower center, the port to the blast pipe is opened and the steam admitted that blows the coal out into and distributes it over the firebox. Then, as the valve rises, the ports to the jet and the lower end of the operating cylinders are closed, that to the upper opened and the cycle repeated.

The maximum rate of feed used upon a class H-6-A locomotive of the Pennsylvania Railroad, which is of the consolidation (2-8-0)



Front Elevation and Section of Hayden Mechanical Stoker.

type, is about 14 strokes per minute. As the worm gear has 72 teeth, the speed of the small valve-operating engine is about 1,000 r.p.m.

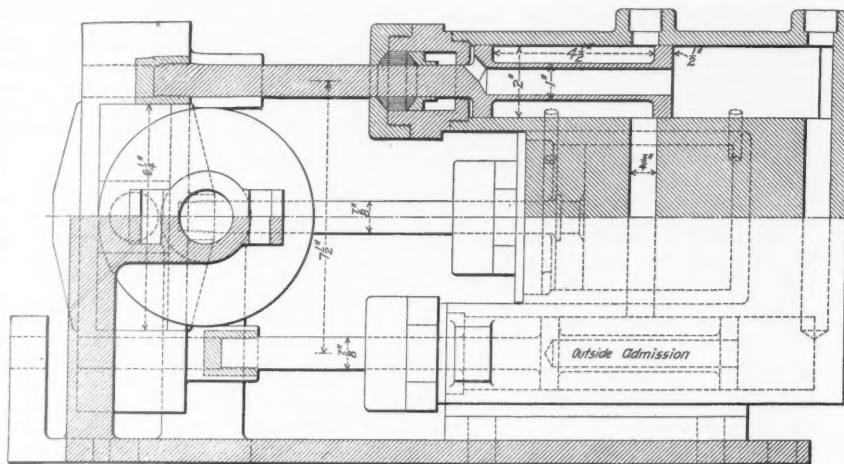
The operating cylinders themselves had to be worked out very carefully so that slamming would be avoided and a proper cushion be given to the pistons at the ends of their strokes.

This has been accomplished by an ingenious arrangement of check valves shown in the illustration. There are two sets of check valves at each end: one for the admission and the other for the cushion. The latter are so arranged that the piston, with a stroke of $6\frac{1}{4}$ in. travels to within 2 in. of the end with the exhaust port at L open in front of it. This port is then covered and the insignificant resistance of the entrapped steam encountered for the next $1\frac{1}{2}$ in.; after which the piston uncovers the port and steam is admitted beneath the check valve N, which is opened against its spring and steam flows to the top of the piston, where in the last $\frac{3}{8}$ in. of its stroke it gradually comes to rest. The check valves OO in the steam pipes serve to admit steam above the piston and yet prevent a reverse flow into the exhaust during the period of cushioning. In studying this action it must be borne in mind that the pipes PP serve both as exhaust or admission passages according to the position of the distributing valve; also that the port L is not uncovered by the piston when the latter is at the end of its stroke. Then if steam is admitted to the upper pipe P, it passes up through the check-valve to the top of the piston, forcing the latter down until it passes the port L, when the live steam enters the cylinder above the piston by that passage. In the meantime, as the piston approaches the lower end of the stroke and steam is admitted below, the passage to the exhaust in the lower pipe P is blocked by the lower check valve O so that there can be no back flow or escape in that way. Of course the same conditions are obtained on the reversal of the stroke.

The admission of steam to these operating cylinders starts the pistons with a very rapid action. Advantage is taken of this in the construction of the coal valve. A reference to the side elevation and section will show that the lip of the valve is flush with the edge of the hopper on the boiler side but stands about $2\frac{1}{2}$ in. back of it on the other side. There is thus $2\frac{1}{2}$ in. of motion to the face of the valve before it begins to close the opening to the hopper. In this distance it acquires a momentum sufficient to cut

The two at the outside turn almost at right angles and serve to deliver in the back corners of the firebox; the intermediate jets throw the coal along the sides and into the front corners, while the one in the center throws it straight ahead. The actual practical working will be considered later.

Finally, the furnace door has been designed so that it can be opened at any time. It carries a chute on the back into which the coal is delivered from the valve, and beyond this simply takes the place of the ordinary door, and can be used as such in case of any



Conveyor Engine, Hayden Mechanical Stoker.

disarrangement of the apparatus or when it is desirable to rake or inspect the fires.

This sufficiently covers the mechanical features of the device. As for its practical operation, the experience with it has not been extensive, but it has apparently been satisfactory. The important step in the development was to provide for the proper distribution of the coal. This required a long series of experiments and when the adjustments had been so made that this distribution could be relied upon, an application was made to a consolidation locomotive on the Pennsylvania lines of the H-6-A class having cylinders 22 in. in diameter with a piston stroke of 28 in., and weighing 193,500 lbs., of which 173,000 lbs. are upon the drivers. This engine has been in service for about five months and in that time there have been no delays due to stoker failures. The trial as

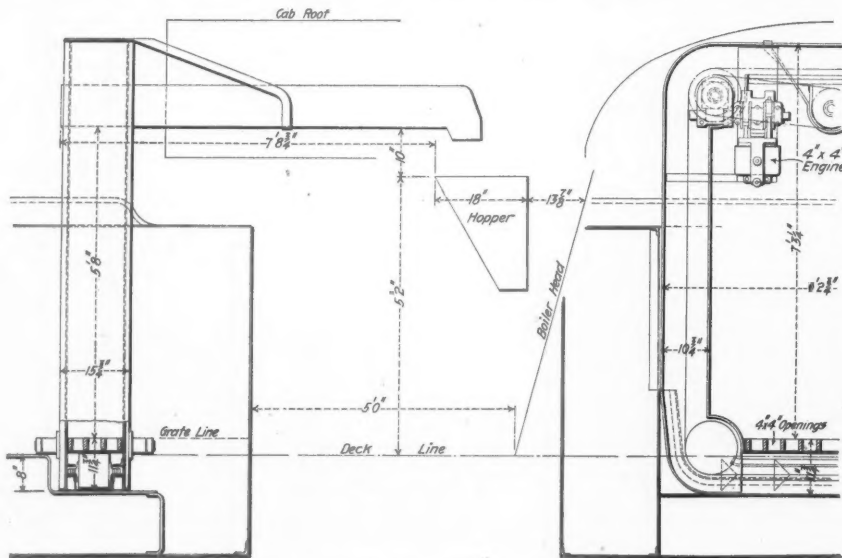
thus far conducted has been more with the idea of determining the value of the device as a labor saver and an efficient steam producer than as a coal saver. In fact, the coal records that have been kept are nearly worthless as will be shown later.

With this in mind, the log of a single trip will be quite as valuable as indicative of what has been done as an attempt to compile a statement based on an average of all that have been run. A round trip from Columbus to Dennison, taken out at haphazard, will serve this purpose. The distance between the two points is 100.3 miles. On leaving Columbus going west there is an adverse grade of 1 per cent. followed by .94 and .78 per cent., making a total upgrade for a distance of 13.6 miles to Summit, from which point there is a down grade of somewhat smaller percentages into Newark, 33 miles from Columbus. From Newark to Dennison the grades are very light and short and the road may be considered to be practically level. On the eastbound trip referred to, the train out of Columbus consisted of 28 cars weighing 1,281 tons, which was increased to 43 cars and 1,839 tons at Newark. In moving about the yard the firing was done by hand in the usual manner; as the work

required was intermittent and it was easier to handle the coal in this way than to start and stop the stoker at such short intervals as would be necessary.

At 12.30 p.m. the engine started with its train, and at 12.33 1/2 the stoker was put into action, delivering coal at the rate of 14 charges per minute. Ten minutes later there was a stop on a siding to permit a passenger train to pass when hand firing was again resorted to.

The safety valves were set to open at 205 lbs. and the pressure was maintained above 195 for the whole trip except on the hill out of Columbus. Here the engineman was not working the engine



Side and End Elevations, Hayden Mechanical Stoker.

through any projecting lumps of coal that may intervene and thus close with the full stroke.

With the coal delivered from the valve, there yet remains the important function of its proper distribution over the grates. This is done by means of five jet nozzles shown in the plan. Steam is admitted to all of these nozzles through a pipe leading from the operating valve already described and in which there is a valve so that the flow, as a whole, can be controlled. Each nozzle is further provided with adjusting valves by which the intensity of the individual jet can be regulated, to accord with the size of the firebox, the intensity of the draft and the quality of the coal used.

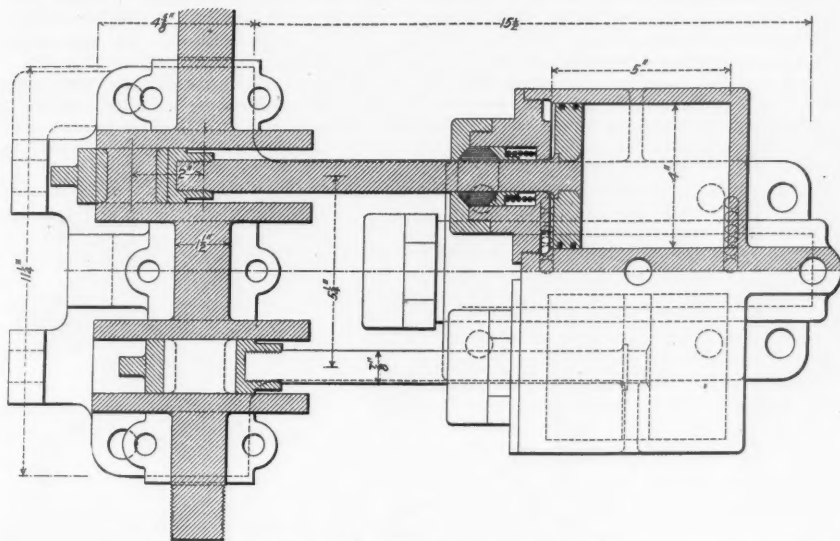
very hard, and the fireman, not noticing it, continued to run the stoker at full speed with the result that a surplus of coal was thrown in and the fire deadened.

It occasionally became necessary to use the hook to level the fire, and this was done 13 times between Columbus and Dennison. The total elapsed time between terminals was 5 hours and 10 min-

tions, the stoker was standing about 22 minutes during the course of the trip. At one point the operating valve stuck for about 6½ minutes and before it was again made operative the fireman threw 37 shovelfuls of coal into the furnace, doing it in eight firings, in which the facility with which the change from stoker to hand firing can be made, was fully demonstrated.

Better results would probably have been attained in this, if the speed of the stoker had been cut down so as to more nearly meet the demands of the engine, whereby the feed could have been made continuous and the necessity for the use of the hook entirely obviated. In fact, on other occasions where attention has been paid to this matter, and the requisite amount of fuel fed with the proper adjustment of the distributing nozzles, it has been found to be possible to avoid the use of the hook. Such a rate of feed would be from six to eight charges per minute.

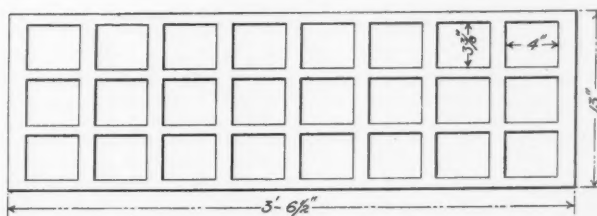
The return trip from Dennison to Columbus was even more uneventful than the other. The engine left Dennison at 8.47 a.m. with 65 cars weighing 2,005 tons, and reached Newark at 12.10 p.m. At this point 20 cars were dropped, and, with the remaining 45, weighing 1,392 tons, the engine left Newark at 1.05, arriving at Columbus at 3.33 p.m. On this trip the stoker was put out of service for nine minutes through carelessness in taking on coal at Consville. About 5,000 lbs. were put upon the tender at



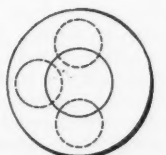
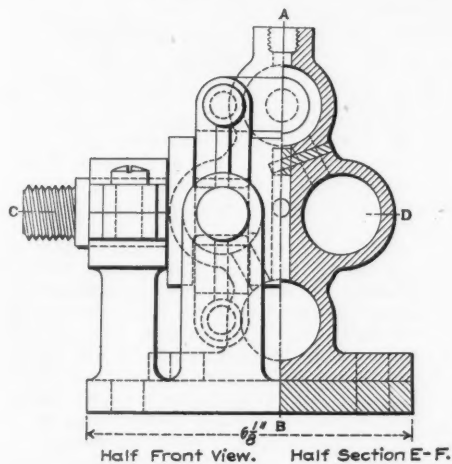
Conveyor Engine, Hayden Mechanical Stoker.

utes, of which 1 hour and 55 minutes were on sidings, giving an actual running time of 3 hours and 15 minutes, or an average speed of 26.1 miles per hour. As a matter of fact the actual speeds varied between wide limits, running from 15 to 50 miles an hour.

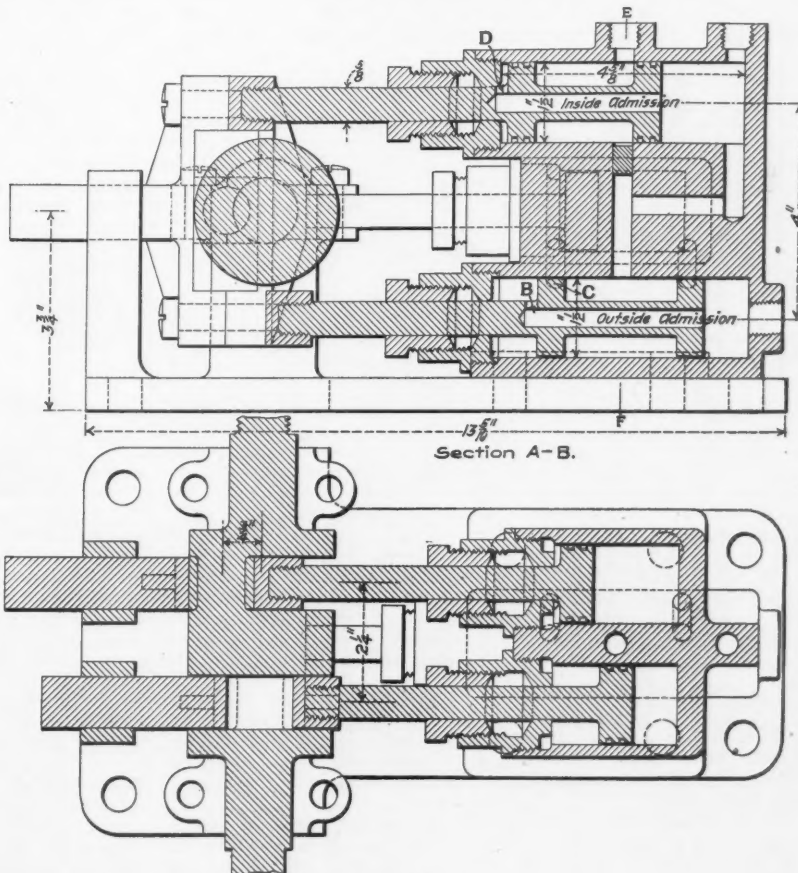
As the stoker was set to feed the coal faster than the requirements of the engine demanded it was necessary to shut it off at intervals in order to let the fire burn down. There was, of course, no regularity in these intervals of stopping. Sometimes they would follow one another rapidly and in quick succession; then they would be separated by wide intervals. In all, under these condi-



Grating in Tender Floor for Conveyor.



End View of Crank
Shaft.



Valve-Operating Engine, Hayden Mechanical Stoker.

this place without a proper adjustment of the gates so that the coal flooded the grate in large lumps and had to be shoveled away before the conveyor could be worked. The manipulation of the stoker was practically the same as on the outward run. It was started and stopped at varying intervals according to the demands of the service, and in all was standing 2 hours 47½ minutes between terminals. The elapsed time was 6 hours 46 minutes, and the actual running time 4 hours and 38 minutes. So that the stoker was idle, while the engine was in motion, for 39½ minutes, and the log shows that the hook was used nine times. The record of steam gage registrations shows that the pressure did not fall below 200 lbs. on the trip. The train was long and heavy and pulled hard, so at least one thing can be taken as demonstrated and that is that the stoker is a thoroughly efficient means of maintaining steam pressure. This is conceded by all.

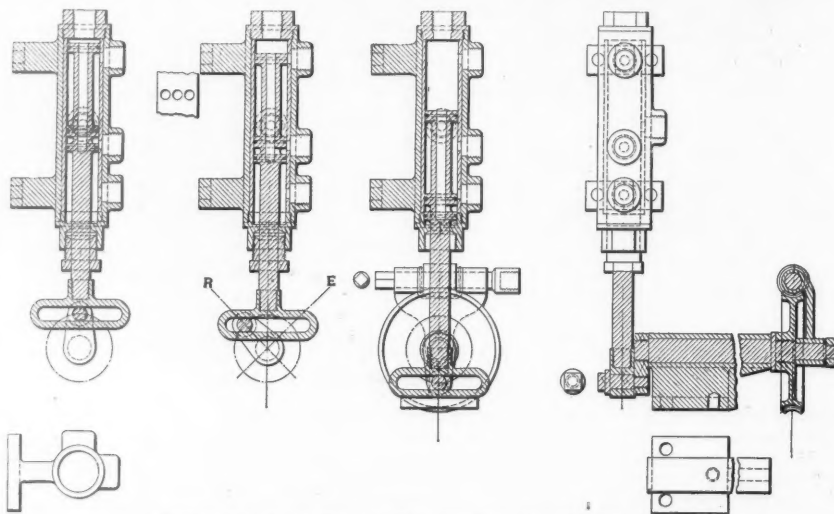
As a smoke preventer, the Hayden stoker ranks with the other stokers on the market in that it does not do it. There was a continuous stream of smoke issuing from the stack at all times when the stoker was in use. It lightened somewhat just before a charge was thrown into the firebox, but the change was apparently insignificant. It is probable that a portion of the gases now escaping in this form could be burned by the admission of more air above the fire, which should be made a matter of further experiment. As the door is now arranged there are two ¾-in. holes through it, one on each side, and it is by way of these that all of the air now admitted above the fire passes.

As the stoker has, thus far, been worked solely with a view to the determination of its capabilities as a means of maintaining a steam pressure, no tests have been made as to the coal consumption so as to compare it with engines not equipped in the same service. The railroad officials seem to think that it burns more, while the owners of the device say that they are burning a mixture of pea, nut and slack, while the other engines are served with a large percentage of run-of-mine. As a matter of fact the records in this respect are worthless. When the coal is not weighed and there is a variation of 2,000 in the estimates made on a single tank full, as in the case of the run from Columbus to Dennison, between that of the man on the wharf and the representative of

though, in reality, this is totally without any foundation in fact, as we shall presently see.

Beyond the possibility of a prevention of smoke and the saving of coal, the successful stoker must be able to maintain the steam pressure and save work for the fireman. We have seen that it can hold up the steam pressure. How is it as a labor saver? As one fireman expressed it, "The stoker saves no work. I would have more time to sit down if I could throw in a half dozen shovelfuls of coal and then sit down and I would rather do it; and as for breaking up coal, I'd quit the job before I'd do that."

Watching such a man at work it is evident that one-shovel firing has no place in his list of accomplishments. With the stoker the fireman is busy, but if it is used intelligently there is no reason why he should not have more time to "sit down" than would be



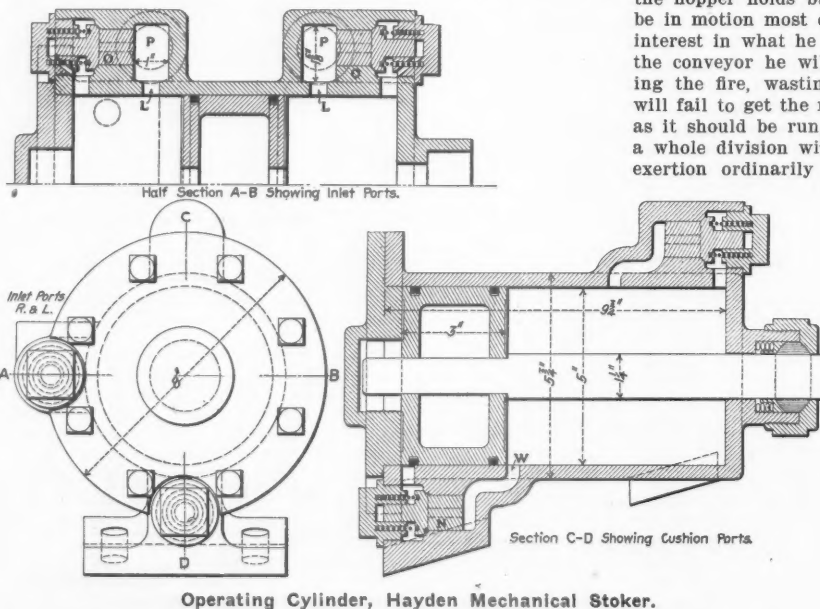
Valve for Operating Cylinders, Hayden Mechanical Stoker.

possible without it. It has been taken for granted, too, in some quarters that the stoker would make it possible to use a cheaper man than at present. This is far from being the case as a first-class man must be employed; better, if anything than at present, and one who will realize the necessity for constant and persistent work. The stoker feeds but a small quantity at each charge and the hopper holds but a small reserve, so that the conveyor must be in motion most of the time. If, however, the fireman takes no interest in what he is doing, and gluts the hopper and overcrows the conveyor he will be spilling coal all over the deck, overloading the fire, wasting coal, putting himself to needless labor and will fail to get the results that he should. But if the stoker is run as it should be run, it can be made to maintain an even fire over a whole division with but an insignificant fraction of the physical exertion ordinarily required. The stoker, however, does require

attention and that, too, of a pretty constant character. The steam nozzles must first be carefully adjusted so that they will give a proper distribution of the coal. If the jets are too strong the coal will be driven to the front end of the box, while, if not strong enough, it will fall short and be apt to bank up in the center, requiring frequent raking in order to keep the fire in condition. With these small but very essential details attended to, the physical labor involved drops to a mere bagatelle and a man should be able to fire a heavy engine over a division without any fatigue. There is no coal shoveling to do, none to lift, merely the drawing of it down to the conveyor grates, or guiding it to them in its natural flow.

And here the matter of the fallacy of the need of putting fine coal upon the tender can be shown. In the case of the run referred to, where run-of-mine coal in large lumps was put

upon the tender at Conesville, the fireman had no trouble in breaking them up as they came down and delivering coal to the conveyor with far greater rapidity than the engine needed to be supplied, so that coal of any size can be used and with no danger of steam failure because of the extra exertion demanded of the fireman. But above all and in it all there must be an intelligent appreciation of the requirements of the fire in order to get the best that there is out of the coal and the stoker; for it affords chance for waste by overloading the fire that does not exist with hand firing since a man will naturally use as little as he thinks he can in order



Operating Cylinder, Hayden Mechanical Stoker.

the motive power department it is readily conceivable that the evidence would not be allowed to have much influence in a court of law. It can only be stated that a careful observation of the working of the stoker leads to the conclusion that it can probably be run in a way to effect an appreciable saving in coal as compared with hand firing.

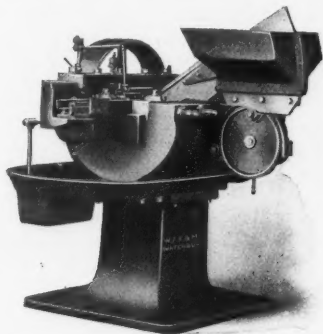
The reason why this combination of pea, nut and slack coal is used, is that it was desired to have coal fine enough to pass through the grate above the conveyor without requiring the fireman to break it. The idea was that this would involve too much labor,

to save his own back, while with the stoker there is no back to save.

One final word may be said, to call attention afresh to the fact, that a change from stoker to hand firing can be made without one moment's delay, and that the door is ready to be opened at any instant to give free access to the fire for inspection or raking.

A New Design of Reciprocating Screw-Thread Rolling Machine.

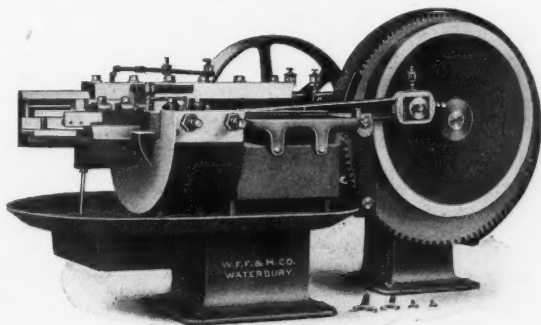
The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., has recently placed on the market a new line of its reciprocating screw threaders which have been redesigned throughout.



The No. 3 Reciprocating Screw-Thread Rolling Machine with Hopper Feed.

The body is provided as well as a geared pump by means of which a uniform flow of oil is distributed over the dies. It is claimed

The machines are made in seven sizes with capacities for rolling threads on wire from $\frac{1}{8}$ in. in diameter up to and including $1\frac{1}{2}$ in. in diameter. Illustrations of the No. 3 and of the No. 4 machines are given herewith. The smaller machines up to and including the No. 4 size are arranged to be equipped with a hopper feed; above this size hand feeding is considered more economical. The machines are all equipped with an automatic feeding device which insures straight and accurate threads even on the longest work. A pan large enough to catch the drip from all parts of the



The Waterbury Farrel Foundry & Machine Co.'s No. 4 Reciprocating Screw Thread Rolling Machine.

that with the No. 3 machine 50 blanks $\frac{3}{8}$ in. in diameter can be threaded per minute, and with the No. 7 machine 20 blanks $1\frac{1}{2}$ in. in diameter can be threaded per minute.

The Division Engineer.

III.

When a Division Engineer reports directly to the Superintendent on maintenance matters, it sometimes occurs that the Chief Engineer objects to the Division Engineer's being as useful as possible. I have had a Chief Engineer object to my running grades and centers for track whenever useful to the Superintendent, and when he so requested. Some Chief Engineers think the line and level for the track on maintenance is the track foreman's work, and that engineers should be above it. But of whatever craft a railroad man be, his skill should be used to further the company's interest. We must all strive to be useful. When a track man or a bridge man wants a line or levels to work to, he should have them. A Division Engineer is in an organization to strengthen it by his technical skill and by his team work with other men there. He should strive to be missed very much when he leaves that division. He is working, first of all, for the stockholders.

With the Master Mechanic of the division I always kept on the best of terms. There is no reason for any other attitude. I repaired his buildings, and he repaired my machinery. Whenever he was a mechanical engineer we always moved in double harness, to our great comfort and the company's best interest. The traffic representative could do little for me save to give the glad hand, but I could aid him, and always did so. It is worth much to him for you to say in advance or informally whether or not a track could

practically be built to a factory site. It is worth much to him if, in securing business, he can have your interested efforts and tactful aid in treating with the shippers.

Finally, in this important matter of working with officials of other departments of the division, as you go about over the division always listen to the Station Agent. If at a competitive station, you have to listen to him, for he is on the line of battle for business, and you must help in the fight and throw your weight into the balance for your company. If he is only an agent at a local station you must not despise him, either. There are three classes of men in railroad service to-day to whom I always feel impelled to take off my hat, viz., an agent at a one-man station, a section foreman and a bridge foreman. Without these men we are as nothing. They do much for little. Their work is never done. They are always liable to a call of duty. They have more all-round railroad ability and railroad responsibility than any of the rest of us. A Division Engineer should be such a man as the agent at a local station is glad to see around. Mend the hole in the platform, fix the door-lock, give him a new office floor, paint the waiting-room and patch the roof whenever it is necessary; anyhow, look at it with him. He has a rather lonesome job, and appreciates your human interest in his efforts to be all things to all men. Agents get the traffic, and traffic is fundamental, while maintenance is a contingency.

What is the proper way for a Division Engineer to treat his engineering assistants? It is generally conceded that the golden rule is the best foundation for proper treatment between man and man, or, as we now phrase it, "the square deal." In the treatment of those engineers less experienced in railroad work, were I to suggest a variation from that general rule I would engraft on it what may be termed the *eleventh* of the decalogue.

On the first full-sized locating party of which I ever had charge, the assistant and second in rank, was an engineer older than myself, whose health had prevented his advancement. He was a very fine fellow, a captain, wounded at Gettysburg. After a couple of months I privately asked him in what respect I would be most apt to fail as a chief of party. He replied that I would kill the party with kindness. Yet that party within two years reduced the cost per mile of located line 50 per cent., as shown by the company's accounts. Four of the sixteen men remained with me ten years, at which time I left the service. They were the reliable, efficient nucleus of the best party of that company's service.

Never drive young engineers. Lead them instead. If as Division Engineer on maintenance you drive your engineering assistants, then I can go on that division and do the same work in the same time, and loan temporarily one-fourth of the men to the Chief Engineer at any time the service needs them elsewhere. I have never felt the competition of another Division Engineer who drove assistants.

Tell assistants what you wish done, and be most explicit. I asked one of my younger men one day if he understood. He replied, "Why, you have made it as plain as the letters on that box car over there." Give them good instruments and implements, proper plans and enough men. Show them how to do the work at the start, if necessary. Set them a good example by doing your own work well, promptly and cheerfully. Tell them you will judge them by their results. Coach them from day to day and never let them be humiliated by getting far wrong. If after six months of such handling a man is not doing good work and enough of it, then send him in to the chief engineer and say he will not make a man the company needs. Do not be such a fool as to think you can drive a lazy, careless, incompetent young civil engineer and make him a good man to keep. Never wrangle with assistants. Whether they be good or bad engineers, whether you personally like them or not, see to it that they like you and feel that you are their friend. The division engineer must be the most popular civil engineer on that division or he will fail in some degree.

Lest what precedes be misunderstood, I wish to say that I think the young American civil engineer, as he graduates from our best technical schools and from the good homes of this land, is as high a type of young manhood as Almighty God has yet been able to make. They are better educated than we division engineers were when we left college. Given such engineers of sufficient experience for their position on a locating party, fill out the rank and file of that party with ex-soldiers, plainmen, woodsmen or cowboys, and there is no work, no exposure and no danger a good chief of party cannot lead them to face. These men are each and all invincible when well led. The material for engineer parties in this country to-day is of the very best. Never have two assistants of the same rank. If the title and pay be the same, make seniority of service count as rank as in the army. I find this prevents bickering and fixes responsibility. Whatever else you do, always handle the work so that some one man is responsible for it. Allow no ill-feeling between men. Never let engineers fight it out, literally or in spirit, although for laborers this sometimes does very well. Early and late keep before them the necessity of harmony. Go away on a visit, so as to try them out in getting on together. Go on inspection and say you leave other work to them for a week, barring emergencies. I doubt whether a civil engineer

who fails to control his temper can ever be worth \$2,000 a year to a railroad company. Team work is the new learning of railroad life to-day, the day of star performers has passed. RAILROADER.

Washington Correspondence.

WASHINGTON, Feb. 27.—Washington has not yet fully recovered from the surprise occasioned by the unexpected turn of affairs in the Senate Committee on Interstate Commerce last Friday when the Hepburn railroad rate bill was ordered reported to the Senate without amendment and was put in charge of Senator Tillman, of South Carolina, the senior Democratic member of the committee. This result was brought about by the combined action of two of the most astute parliamentarians in the Senate—Senator Aldrich, of Rhode Island, and Senator Bailey, of Texas. It is doubtful if it will ever be known just what occurred in the conference between these two leaders on opposite sides of the Senate that took place during the two hours' recess of the committee that preceded its final action, but there is little doubt that an understanding was reached between them as to the action to be taken in the committee, and it is not unlikely that the understanding will go so far as to affect the management of the bill in the Senate.

The strength of Senator Aldrich as a Senatorial leader has rested almost as much on his ability to keep in touch with the leaders in the Democratic party as on his influence over Republican Senators, and it may be that the outcome of the Senatorial contest over the Hepburn bill will demonstrate that the Senator from Rhode Island has gained a decided advantage for the advocates of conservative legislation by the seemingly paradoxical method of putting the railroad bill in the hands of one of the most radical men in the Senate. Certain it is that Mr. Bailey, who is not a member of the Committee on Interstate Commerce, and who is himself an advocate of amending the Hepburn bill by including in it an express provision for judicial review, succeeded in persuading Senators Foster and McLaurin, who were insisting on a review provision, to cast their own votes and that of Senator Carmack, whose proxy they held, in favor of reporting the bill to the Senate without amendment but with the express understanding that every member of the committee was to have full liberty to vote for amendments and to offer amendments. The action of the committee, therefore, was equivalent to reporting the bill to the Senate without any recommendation.

There has been a disposition in some quarters to believe that Mr. Aldrich made a tactical blunder in having the bill put in charge of Senator Tillman. What he probably wanted to do was to emphasize the fact that the Senate proposes to deal with the problem of railroad legislation without executive interference. Putting the bill in charge of the bitterest personal enemy of President Roosevelt in the entire Senate served to emphasize this, but Senator Aldrich probably counted on Senator Tillman's taking the first opportunity to give oral expression to the intention of the Senate to disregard White House influence. If this was what Senator Aldrich was counting on he was not disappointed, for Senator Tillman lost no time in issuing a declaration of independence to the press in which he said: "The President has performed his full official duty in connection with this bill. He has nothing more to do with it until it comes before him as an act of Congress for his approval or veto. The Senate alone has the say now." There is no doubt that Senator Tillman will say something to this same effect in the Senate if the opportunity arises and there is any talk of Presidential interference.

Uncertainty as to what disposition will be made of the Statehood bill—the unfinished business before the Senate—makes it impossible to predict how soon the railroad rate bill will be taken up, but Senator Tillman has given notice that he will push it to the front as soon as possible. He is not likely to encounter opposition from any quarter, as the Senators who are opposed to the Hepburn bill seem to be fully as anxious as its friends to bring the conflict on as soon as possible and have it over with. They will not seek to delay the bill or to postpone the final vote any longer than is necessary for them to present their arguments against it and in favor of such amendments as they may believe should be adopted. It is expected that if the bill can be amended so as to provide expressly for an adequate judicial review it will receive the votes of nearly all of the members of the Senate. Senator Foraker, alone, has announced emphatically, both in the Senate and out of it, that he will not vote for any measure that proposes to give the Interstate Commerce Commission authority to prescribe transportation charges. Senator Morgan, of Alabama, will probably stand with him, and it is possible that Senator Pettus, of Alabama, may also vote against the bill, even if amended so as to provide for review.

Those Democratic Senators who are following the lead of Senator Bailey hope that they will be able to obtain decided party advantages from the fact that the railroad bill has been put in charge of the Democratic side of the Senate. An effort will be made to secure harmonious action by Democratic Senators on all amendments, with the hope that the bill may be put into its final form

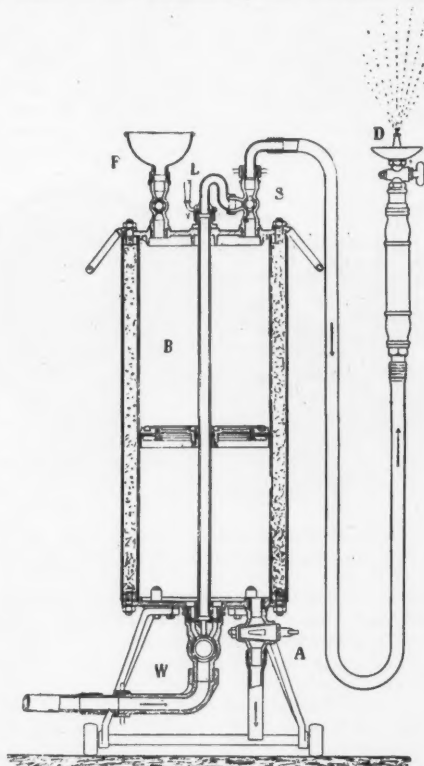
by the Democrats with the help of a minority of Republicans. This gives great importance to the Democratic position on the question of review. There are decided differences of opinion on this question among Democrats as well as among Republicans, and it may be difficult for Mr. Bailey to get his party solidly in line in support of any specific amendment. At present the indications are that the Democrats who are in favor of review will endeavor to frame an amendment that will receive the approval of most of the men on their side and that will provide for review while attempting to deny to the courts power to suspend an order of the commission pending review.

Senator Lodge to-day introduced an amendment to the Interstate Commerce law, providing for displacement of the present Interstate Commerce Commission by a new commission of nine members. The amendment provides that not more than five of the members shall be of one political party; that three of them shall be lawyers; three, persons of experience in the management of railroads. Salaries are fixed at \$12,000 for each member except the chairman, who is to receive \$500 more.

J. C. W.

Disinfecting Apparatus for Railroad Cars.

The disinfection of passenger and cattle cars by means of carbolic acid is attended with difficulty, and even with danger to the employees carrying it out. If applied with a brush, the acid does not always cover all the surface nor penetrate the cracks. To apply it to the ceiling the employee risks getting burned or blinded; and as the air itself is not disinfected, the workman himself can be



Section Through the Koerting Disinfecting Apparatus.

infected. Washing the car with soda solution at a temperature of 125 deg. Fahrenheit is not always practical in winter, as the solution will not retain the desired temperature long enough. The apparatus here shown is used in Germany with success and satisfaction. There is a cylinder B which is filled with the disinfecting fluid, through the opening F. It is then connected by the nozzle W and inlet hose with a water main, steam pipe or hand air pump—anything to give a pressure of from 10 lbs. to 60 lbs. to the square inch. An air-tight piston in the cylinder is driven down and the disinfecting fluid is driven out through S by the pressure of the steam, water or air, and the liquid is sprayed into the car. After use, the water is let out through A. The fluid used is dilute carbolic acid, lisol, pinol, formaldehyde, or whatever is legal and desirable. The makers of the device are Körtling Brothers, Hannover.

Through an unfortunate oversight, the name of Professor E. R. Dewsnap, of the University of Chicago, was omitted as the author of the paper on Railway Education, printed in the *Railroad Gazette*, Feb. 16. We wish to give Professor Dewsnap full credit for his interesting discussion.

GENERAL NEWS SECTION

NOTES.

The Philadelphia & Reading is putting up wires for a telephone line between Philadelphia and Tamaqua.

The Northern Pacific has notified its connections that it will no longer receive freight cars not equipped either with air-brakes or with train pipes for air-brakes.

The Canadian Pacific, besides building a great hotel at Winnipeg, is to spend this year \$500,000 in making additions to its hotels at Banff, and other places in the Rocky Mountains.

Chicago papers report a speed war between that city and Cincinnati. The Big Four and the Chicago, Indianapolis & Louisville now run trains through, about 300 miles, in 8 hrs. 15 mins.

A press despatch from St. Paul says that Mr. J. J. Hill is to offer cash prizes to farmers along the line of his railroad for progress and improvement in various kinds of farming, including cattle raising.

A press despatch from Chatham, Va., says that Eanes and Gipson, tried there for wrecking a freight train near Franklin Junction, Va., have been sentenced to 10 years each in the penitentiary.

Philadelphia papers say that there was a conference of railroad officers in that city last week at which it was decided to contest the validity of the new two-cent fare law of Ohio. According to the reports, most of the principal roads doing business in Ohio were represented at the conference.

The Ontario Central Despatch fast freight line has been formed, succeeding a number of fast freight lines in which the N. Y., O. & W. was interested. It is to operate over the Michigan Central; Rome, Watertown & Ogdensburg division of the New York Central; New York, Ontario & Western, and New York, New Haven & Hartford.

A press despatch from Minneapolis says that large quantities of oats have been taken from that city to New Orleans for export at about 18 cents per 100 lbs. One account gives the total sales in a week as 2,000,000 bushels. Some went by the Chicago & North-Western and the Illinois Central, and some by the Burlington to East St. Louis and thence by the Illinois Central.

"Humboldt is hot," we are informed by the *Nashville American*, over the high prices which the fruit shippers there have to pay for refrigeration in Armour cars. The Armour cars, says the reporter, are no better than those handled by the Illinois Central. The fruit shippers of Humboldt claim to have been overcharged by the Armour Company \$30,000 or more in one year.

The State Railroad Commission of Georgia has been restrained, by temporary injunction, issued by Judge Pardee in the United States Circuit Court at New Orleans, from enforcing the order recently made to reduce by about 10 per cent. the freight rates on the Southern, the Central of Georgia, and the Atlantic Coast Line; and the case is to be heard by the Federal Court in Atlanta this week.

The railroads from St. Louis to Texas have recently been running their mail trains at very high speeds, apparently in an effort to show the government what they can do; and the St. Louis, Iron Mountain & Southern, in connection with the Texas & Pacific and the International & Great Northern, recently ran a train from St. Louis, Mo., to Austin, Tex., 849 miles, in 21 hrs. 15 min., which is equal to 40 miles an hour.

All members of the Oklahoma Supreme Bench have returned their railroad transportation and will hereafter pay fare. As the action of the judges followed so closely their conference with President Roosevelt, it might be concluded that the return of the passes was a result of the conference. From an official source it was also learned to-day that Governor Frank Frantz recently returned his Rock Island pass. Judge Luman F. Parker, the newly appointed Indian Territory judge, has also returned his pass.—*The Oklahoman, Oklahoma City.*

The Supreme Court of Texas has decided that exclusive contracts made between railroads and express companies are in violation of the Anti-Trust act of 1903. The suit was against the Missouri, Kansas & Texas Railway and the American Express Company. That the contract was made and entered into prior to the passage of the Anti-Trust act of 1903 is held to be without weight. The penalty provided for under the act is \$50 a day from the date the law became effective, April 1, 1903. The four express companies operating in Texas are the American, the Wells-Fargo, the

United States and the Pacific. Reports say that the railroads and the express companies will join in carrying the case to the United States Supreme Court.

A sub-committee of the Philadelphia City Council dealing with the smoke nuisance, is to recommend an amendment to the present ordinance which will put the penalty in the cases of smoke emitted from locomotives on the engineer and firemen. The sub-committee will confer with the officers of the Pennsylvania Railroad Company in regard to framing the amendment. A member of the committee is reported as saying: "Officers of the Pennsylvania Railroad Company are in sympathy with the public demand, but the company prefers that City Councils place the penalty for a violation of the ordinance on the fireman and engineer of the locomotive that is reported. If the company is held responsible it must punish the offending engineers and firemen. Such a course, the company fears, might be resented by the Brotherhood of Locomotive Engineers and kindred labor organizations, and cause trouble for the road. This could be obviated by Councils fixing the blame and penalty where it belongs." As a means of allaying a spirit of resentment, the proposal to make an engineman appear in court on a criminal charge, certainly deserves the prize.

After a series of conferences extending over more than a month the officers of the New York, New Haven & Hartford have advanced the pay of a number of classes of trainmen, as follows: Conductors on through trains between Boston and New York to receive \$5 a day and two uniforms a year. Electric conductors from \$2.50 to \$2.60 a day; ticket collectors from \$2.75 to \$2.85; train baggage-masters from \$2.15 to \$2.25 a day; rear brakemen from \$2 to \$2.10 a day; brakemen \$2 a day; through freight flagmen from \$2 to \$2.20 a day; freight brakemen from \$2.10 to \$2.30 a day; way freight flagmen from \$2.35 to \$2.60 a day; way freight brakemen from \$2.25 to \$2.50 a day; day yard conductors, 10 hours, from \$2.80 to \$3 a day; night yard conductors, 10 hours, from \$2.90 to \$3.10 a day; day brakemen, 10 hours, from \$2.35 to \$2.50; night brakemen, 10 hours, from \$2.45 to \$2.60. The yard conductors and brakemen at Springfield and Providence have had their workday reduced from 10 hours to eight hours. . . . The newspapers say that the Superintendent's order containing the rules about neatness of personal appearance has been re-issued and that traveling inspectors are to be employed to see that the rules are obeyed. According to one reporter, the order says that a plain black necktie is "preferable." This is a decided relaxation from the former rule, which, we believe, said that plain black ties were required.

Lehigh Valley Industrial Book.

"Industrial Opportunities Along the Line of the Lehigh Valley Railroad" is the title of a new book just issued by the industrial department of the road. Its object is to call attention to the variety of raw materials and the desirability of locations for industrial enterprises in Lehigh Valley territory. The supplies of coal, clays, cement, slate, salt, gypsum, sand, stone and timber available are separately described as well as agricultural possibilities along the line. In regard to this last, it is argued that, prospective farmers, instead of going West, can, with the aid of modern expert agricultural knowledge, invest money more profitably in some of the well situated but run-down farms of the East.

The book includes alphabetical lists of the principal shippers and receivers of freight at each station on the 1,344 miles of Lehigh Valley main and branch lines, and a new industrial map of the territory in colors indicating the location of the various raw materials available.

Panama Canal Purchases.

D. W. Ross, General Purchasing Agent of the Panama Canal Commission, testified before the Senate interoceanic canal committee that he had bought steel rails at from \$1.60 to \$2.50 a ton less than was charged to the railroads in this country. The Commission paid the export price on the rails. Mr. Ross, who was formerly Purchasing Agent of the Panama Railroad, said that he was entirely familiar with the fact that rails were sold abroad at lower prices than for domestic use. He asserted that the railroads were content to pay the extra charge because they believed that the market for steel products abroad served to maintain the balance of trade, and for that reason tolerated it. Senator Taliaferro suggested that this was very magnanimous on the part of the railroads. Questioned as to the contracts for 100 switching engines in which the lowest bidder, the Lima Locomotive & Machine Co., failed to secure the contract, Mr. Ross explained that there were three bidders, the Baldwin Locomotive Works, at \$12,000, the American Locomotive Works at \$11,100, and

the Lima firm at \$9,850. The reason the Lima firm did not get the contract was that Chief Engineer Stevens decided that the firm had not complied with the specifications in any particular, and that the type of engines it offered was too small for work on the isthmus.

Single-Phase Alternating Current Equipment for Milwaukee Electric Railway and Light Company.

The Milwaukee Electric Railway and Light Company, Milwaukee, Wis., is about to equip two suburban extensions of its lines with the alternating current apparatus made by the General Electric Company, Schenectady, N. Y. One of these lines will extend from Waukesha to Oconomowoc, 20 miles, and the second will operate between Hale's Corners and Mukwonago, 16 miles. Both lines will be operated at a potential of 3,300 volts, and in addition the motors are designed to run on the existing seven miles of 550-volt direct trolley line between West Allis and Milwaukee.

The motors to be furnished for this equipment are the standard General Electric alternating type. Each of the 10 cars comprising the initial equipment for the road will be furnished with four motors of 75 h.p. each, known as the GEA-605. They are of the compensated type, comprising an armature similar to the ordinary standard direct current bar wound form with mica insulated coils. The motor fields consist of laminated pole pieces over which are slipped the spools of the exciting winding. The compensating winding consists of a bar winding inserted in the pole faces and permanently connected in series with the armature winding. The 75 h.p. motor is wound for four poles, and has a maximum speed of about 140 r.p.m.

These equipments will in general be operated as single cars but occasionally will be run in two-car trains. For the flexible control of these train combinations the Sprague-General Electric system of multiple-unit control will be used, adapted for operation on alternating current. Further details of this interesting adaptation of the system which has been so widely used for direct current work will be published later.

The compensator for use in these cars is of the oil cooled type, and is wound for 3,300 volts on the primary, with five different secondary taps for controlling the speed of the motor. In order that the acceleration may be smooth, special devices are employed so that there will be no break in the circuit from one tap to the next during a change in speed. The speed regulation is so devised that the running speed will be the same on both the alternating and direct-current portions of the line.

Distribution to the various transformer sub-stations on this line will be at 33,000 volts. At the stations the current will be fed to the trolley line at 3,300 volts. The General Electric catenary construction for the trolley line will be used. It is proposed to have these roads in operation during the fall of 1906.

Resignation of Kuhn-Loeb Partners from Railroad Boards.

The members of the banking firm of Kuhn, Loeb & Co. have resigned from all railroad directorships held by them. The list of roads in which the members of the firm have been directors follows:

Jacob H. Schiff—Union Pacific; Chicago & Alton; Chicago, Burlington & Quincy; Denver & Rio Grande; Baltimore & Ohio; Northern Securities Company.

Otto H. Kahn—Baltimore & Ohio Southwestern; Union Pacific; Southern Pacific; Oregon Railroad & Navigation; Oregon Short Line; Pacific Mail Steamship Company; Railroad Securities Company; Leavenworth, Kansas & Western, and Louisiana Western.

Mortimer L. Schiff—Chicago, Burlington & Quincy; Chicago & Alton; Denver & Rio Grande; Rio Grande Western, and Southern Pacific.

Paul M. Warburg—Oregon Short Line and Pacific Mail Steamship Company.

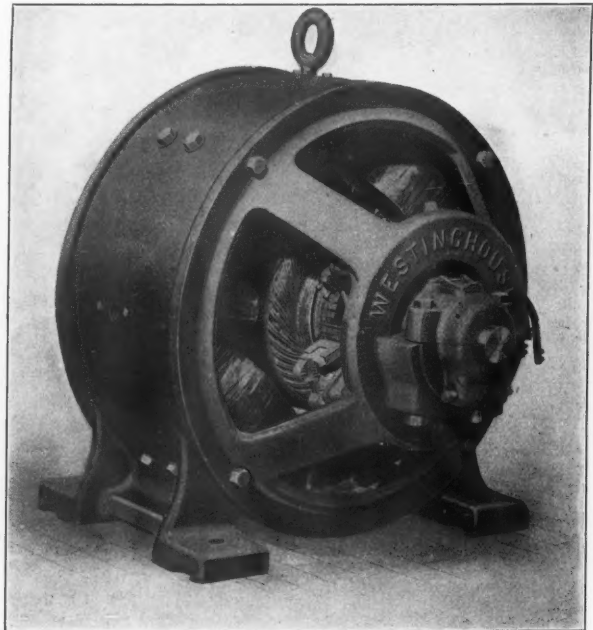
Only a Dream.

Lulled by the motion of the car, the lanky passenger with the bundles was almost across the border of dreamland, when he became dimly conscious that the train was slowing up. Presently it came to a dead stop, half way between stations. The long cars of the train were filled with suburbanites on their way home, and all of them had that absurd, unreasoning anxiety to get there that is so incomprehensible to conductors and brakemen. That is why, after the train had stood still five or ten minutes, they began to grow restive and to inquire what was the trouble. Some of them even went so far as to leave the cars and walk ahead in the darkness to try to find out. But the lanky suburbanite with the bundles kept his seat and waited patiently. Presently his meditations were disturbed by the loud, clear voice of the conductor, who called out: "On account of an accident to a train ahead of us this train will be delayed here about forty minutes. A Wabash dummy is off the track. Passengers who do not care to wait or have not far to go will get home quicker by walking ahead a few blocks and taking the crosstown cars." Then the lanky passenger gave himself a violent wrench and woke up. Even in his sleep he recognized the absurdity of the incident and knew it to be a dream. Conductors don't act that way.—*Chicago Tribune.*

The Westinghouse Direct-Current Variable-Speed Auxiliary-Pole Motors.

In many classes of work a wide speed variation is required, and to meet the demands of such service the Westinghouse Electric & Manufacturing Company has developed a line of direct-current motors having a speed range of 4 to 1 on a single voltage. This wide speed variation in this new type of motor, which is known as the S A type, is obtained by field control, and it is claimed they compare favorably in every respect with the best direct-current constant-speed machines. The new motors are exactly similar mechanically and electrically to the Westinghouse type S motors, except for the addition of auxiliary poles and coils. These are introduced in order to control the field form during the variation of field strength necessary to obtain so wide a range of speed. The cast-steel poles with machine-formed coils are placed midway between the main poles and securely bolted to the frame. The construction is very simple, and introduces no complications whatever, nor does it make difficult the removal of the main poles and field coils, as is evidenced by the fact that an auxiliary pole and coil can easily be taken out, without in any way disturbing the main field winding, by simply disconnecting the coil connections, withdrawing the bolts which hold the pole to the frame and sliding the pole and coil out parallel to the shaft.

The auxiliary field winding is connected in series with the armature and therefore produces a magnetizing effect which is proportional to the armature current. The auxiliary coils are placed



The Westinghouse Type S. A. Direct-Current Variable-Speed Auxiliary Pole Motor.

as close to the armature surface as mechanical considerations will permit, and their turns are concentrated at that point. This arrangement adds materially to the performance of the motor as it applies the corrective influences of the auxiliary winding directly at the points where the distorting effect of the armature current is strongest. This arrangement, it is claimed, is much more effective than the distribution of the ampere turns along the length of the auxiliary poles. The magnetic field of the auxiliary winding acts in direct opposition to that produced by the armature current. The resultant field is made up of three components—that due to the shunt winding, that due to armature reaction, and that due to the auxiliary windings. The field distortion usually produced by armature reaction is therefore overcome, and the shape of the magnetic field at the point of commutation is maintained as formed by the main poles, and good commutation is made possible over a wide range of speed.

These motors are shunt wound, which gives a definite speed for each point of the controller, which is nearly constant for all loads. Heavy overloads may be momentarily developed without injurious sparking. The motors are reversible without danger and without readjustment of the brushes, and, as the armature and auxiliary windings are connected permanently in series, it is only necessary to change the external armature connections to reverse the directions of rotation.

These motors develop their full rated output throughout their entire range of speed. They will carry full rated load at any speed within their range for six hours with a temperature rise not ex-

ceeding 40 degrees Cent. in armature and field, and not exceeding 45 degrees Cent. on commutator, as measured by thermometer. At all loads and all speeds commutation is excellent, and an overload of 25 per cent. may be carried for one hour without injurious sparking. All motors are thoroughly ventilated, running cool and at a uniform temperature. Their efficiency is high and their speed regulation practically exact. With the exceptions noted, type SA motors are mechanically identical with the type S, and corresponding parts are interchangeable.

Freight Traffic on English Tramways.

Not content with taking away from railroads their short distance passenger traffic and making them as taxpayers help to support this competition with themselves, some English municipalities have also turned their attention to the carriage of freight on their electric tramcars, and have practically become common carriers. The largest municipal venture of the kind was at Manchester. This competition with Sutton & Co., a big firm of carriers, who were large ratepayers, was so manifestly unjust that they took the matter to the High Court of Justice with a view to ascertaining exactly how far the corporation could go under its Electric Tramway Powers Acts. The matters were considered very fully by Mr. Justice Farwell. Sutton & Co. asked the court to declare that the municipal Tramway Department had no power to convey, collect or deliver for reward any parcels or goods by means of road vans, hand carts or messengers, or otherwise than by their tramways. The Department had, in a pamphlet, published its rates and arrangements "for conveyance of parcels traffic from Manchester to all parts of the United Kingdom and abroad," and announced itself as agent for all railway companies, and even accepted traffic "for abroad." Mr. Justice Farwell, in his judgment, says that there is nothing *ultra vires* in delivering by cart such goods as have been carried over its lines; they must be allowed to use horses and carts to get the goods to their depots, and to convey them to the consignees' addresses. So far as this arose out of the tramways undertaking there was no objection to it, but the Manchester Corporation is not entitled to spend any part of the city funds or the receipts of the tramway undertaking for the purpose of establishing or maintaining business as carriers, except as part of the regular tramway business. The corporation, it should be mentioned, proposed to collect and deliver parcels outside the radius of their tramway system, and parcels which had never traveled and were not intended to travel over the tramways. A large expenditure had been made for horses, vans and plant for this purpose.

Results Under Electrification in England.

The North Eastern Railway reports that both operating and financial results under electric traction on the suburban lines in the Newcastle district have been entirely favorable. The following comparative figures are given:

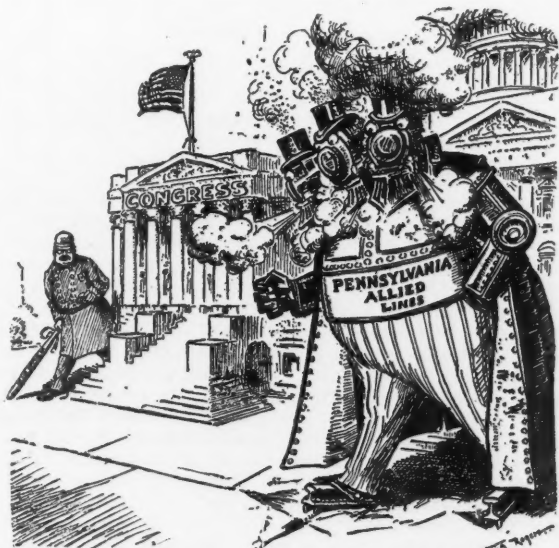
	1903, steam.	1905, electric.
Passengers (half year).....	2,844,000	3,548,000*
Earnings (year).....	\$626,940	\$733,860
Running expenses (year).....	207,818	232,206†
Running cost per train mile.‡...	35 cts.	18 cts.

*Increase, 25 per cent.

†Double the number of trains.

‡Including repairs to rolling stock and depreciation.

By running smaller trains and more of them the company has both pleased the public and made better profit.



A Policeman's Lot Is Not a Happy One.

Rogers in New York Herald.

A Collision at Cleckheaton.

Colonel Drutt has reported to the British Board of Trade the circumstances of a collision on the Lancashire & Yorkshire, last Christmas day, in which there was a curious combination of a green signalman, a careless signalman who was not green, and a mystifying juxtaposition of a Sunday and a holiday which appears to have led some one to forget that a local freight train would need attention Monday morning. There were no very serious injuries. Col. Drutt's conclusion says:

The causes of this collision are clearly indicated in the evidence of signalman Wright, on duty at Cleckheaton South signal-box, and of porter signalman Dawson, who was on duty at Cleckheaton station at the time, both breaking the rules of block working.

Cleckheaton North signal-box is open on Sundays up to 8 a. m., and is then closed till the following morning. The notice circulated for working the traffic on Christmas Day stated that the 2.50 a. m. goods train from Wakefield to Bradford would work as on Sundays.

On Sundays, the North box being open till 8 a. m., this train puts off any wagons for Cleckheaton at this signal-box, but Christmas day falling on a Monday, it followed that the North box was not open, as it was closed after 8 a. m. on Sunday and was not reopened. When the goods train approached Cleckheaton the men in charge say they expected to find the North box open, and to run through the station to that signal-box. Finding it closed the guard, after consultation with the driver, walked back to the station and after some conversation with porter signalman Dawson, the latter agreed to open the North box, so that the wagons for Cleckheaton could be put off the train. All this took some twenty minutes, and by the time Dawson got to the North signal-box, the 6.40 a. m. passenger train from Mirfield to Bradford had arrived at the station, viz., at 6.54 a. m.

Dawson having opened the North box, immediately switched in and gave the bell signal for opening, first to the South box and then to Low Moor*No. 2, the box in advance, without first giving notice to the signalman by telephone, as required by Rule 24. As soon as he had done this, signalman Wright, at the South box, although he had not received the "Train out of section" signal for the goods train, offered Dawson the passenger train, and Dawson, without thinking, at once accepted it, although the goods train was still standing just in front of his signal-box, so Wright lowered his starting signal for the passenger train to proceed. As soon as Dawson had accepted this train he recognized his error and at once called up Wright on the telephone, saying the goods train was at his box and asking Wright to stop the passenger trains. * * * When the passenger train left Cleckheaton, driver Sykes states that seeing the North box distant signal "off" and unlighted he assumed that the North box was closed and that he had a clear road to Low Moor, so he did not look for the North box home signal as it was unlighted, and as he had turned round to attend to the injector (the engine being bunker first) he did not notice the tail lamps of the goods train until the guard of that train, who had run back a short distance with his red hand-lamp to try and stop the passenger train, shouted out to him. Driver Sykes had only time to shut his regulator and apply the brakes when the collision occurred.

Porter signalman Dawson was not, I consider, justified in opening the North signal-box at the request of guard Marks. Although qualified, he had little experience, and had only previously worked in the North box under supervision.

He opened the box without first telling the signalmen on either side of him what he was doing, and according to the Rule he should have had the signal lamps lighted before dealing with any train.

Although Dawson may have somewhat misled signalman Wright, nothing can justify the latter for offering the passenger train, and then lowering his starting signal for it, without first obtaining the "Train out of section" signal for the goods train; and the very fact of the North box being opened unexpectedly should have made him enquire of the man there if the goods train had cleared.

Signalman Wright had been on duty 13 hours at the time of the collision, as he had arranged without permission to work an extra hour for the signalman next on duty. The tour of duty at Cleckheaton South box is usually 10 hours, but is 12 hours on Sunday when there is little traffic on the branch line between Mirfield and Low Moor.

Good Thunder Potatoes.

The Interstate Commerce Commission, in an opinion by Commissioner Prouty, has announced its decision in the case of Hoerr against the Chicago, Milwaukee & St. Paul. On potatoes c. l. from Mankato and Good Thunder, Minn., to Washington, D. C., and Scranton, the rates are 46 cents from Good Thunder to Washington and 47 cents from Mankato to Scranton. At the same time rates have been in force a number of years from St. Paul and Minneapolis of 37 cents to New York, 40 cents to Boston, 35 cents to Philadelphia, and 34 cents to Baltimore. These rates govern those to Washington and Scranton from St. Paul. The rates from St.

Paul, though the result of competition, have been long in force as normal rates, and are found to be reasonable. The Commission holds that the rates from Mankato and Good Thunder to Washington, Scranton and other Eastern destinations are unjust; also that the St. Paul rate may be used here as a standard of comparison; and that reasonable rates from Mankato and Good Thunder to Washington and Scranton would be 39 cents to Scranton and 38 cents to Washington, which rates would be 4 cents above the rates from St. Paul; and the carrier is recommended to put in corresponding rates from Mankato and Good Thunder to the various eastern destinations. Complainant is awarded reparation.

The B. & O. and the West Virginia Coal Shippers.

Replying to criticisms made in the United States Senate, the Baltimore & Ohio Railroad has sent to Senator Rayner, of Maryland, an explanatory statement, which the Senator has presented in Congress. The complainant, the Red Rock Fuel Company, purchased mines in Upshur County, knowing that the railroad could not enlarge its facilities until it could secure additional cars and engines. The Red Rock tippie was 4,000 ft. from the railroad, and the connection to the main line was half-way between two stations. No coal is hauled over that part of the B. & O. lines. Continuing, the statement says:

"Where there is a coal field sufficiently developed to require special service, the Baltimore & Ohio furnishes special coal switching service to place empty cars at the coal tipples and to take away loaded cars. Where such a special service exists the railroad company can switch cars to a tippie located away from the company's track even as far as four thousand feet, although such a distance would be unusual. Without such special switching service the railroad company cannot switch to and from a tippie so located. To attempt it in connection with regular trains would involve leaving the train on the main track, while the locomotive and crew were gone a mile away. To perform the service demanded by the Red Rock Company, therefore, would require a special switching service for twenty miles each way. The answer of the railroad company to the demand of the Red Rock Company was the same that had been given to their predecessors in title, as they well knew, namely, that until the railroad company could enlarge its equipment it could not provide special service to develop a new coal territory, but must stop at the discharge of its legal obligations as a carrier. They were told at the same time that the railroad company was taking steps to make large additions to its equipment. Thereupon the Red Rock Company filed its complaint before the Interstate Commerce Commission."

The Red Rock lands are in an undeveloped region; and the B. & O. has no switching service within 20 miles either way. The B. & O. has no interest in coal companies in the Fairmont district, but it owns a majority of the stock of the Consolidated Coal Company which, in 1903, acquired a bare majority of the stock of the Fairmont Coal Company; but the road denies that its refusal to comply with the wishes of the Red Rock Company is due to its ownership in other mines. Continuing, the statement says:

"The Baltimore & Ohio has recognized that its duty as well as its interests requires the development of the natural resources of West Virginia as rapidly as possible. The coal production has doubled in five years largely because of its efforts. The vast area of undeveloped coal lands in West Virginia cannot all be developed immediately without reference to the situation or the railroad's facilities and equipment. The Baltimore & Ohio has endeavored to apply common-sense business principles to the handling of a situation forced upon it by circumstances largely unforeseen and beyond its control."

Elephant Power.

A correspondent in India has sent us a copy of the following inquiry that has been received from a native public works department: "We have a number of elephants in the State. I propose to utilize them in working dynamos for six hours every day and generating electricity, to store it in batteries and use it at night for lighting streets. I shall feel obliged if you will please give me the information required in the statement accompanying: (1) How many electrical units will an elephant of ordinary strength, working six hours, produce? (2) Cost of dynamos required. (3) Cost of gear required to work it by elephants. (4) Cost of battery to store the electricity."

The mechanical equivalent of the power of an elephant is probably known in India, but we have not been able to find it in textbooks published here. Probably, as compared with that of a horse, it varies as their respective weights. A central station containing a score of elephants walking round like mill horses, or climbing ramps that slipped away under their feet, would be rather a painful spectacle. It would be a degradation to put such intelligent animals to tread-mill work. Apart from this, however, we see no way in which the enterprising department in question could utilize the source of power at their disposal. We do not suppose elephants could be trained to raise water in their trunks and spurt it on a Pelton wheel; and as we have no means of calculating

the force of a jet of this kind, we are not able to recommend this means. We fear, however, that the word "elephant" will hardly ever achieve further recognition in the industrial world than which has already fallen to its lot, in being coupled with that of "boilers" to designate a type of Continental stationary steam-raising apparatus; and, in this case, it is the bulk of the mammal that has been considered, not its intelligence.—*Engineering* (London).

Proposed Bolivian Railroads.

During the past year surveys were made over a distance of 500 miles by American engineers for new railroads in Bolivia at a cost of \$120,000, which was paid by the Government under contract with a New York firm, which, in the event of its receiving the concession to build and operate the railroads, will refund the money to the Government. Other surveys will be made for an additional 550 miles. Having rejected a proposition of this firm, the Government has asked Congress for authority to contract for the simultaneous construction, if possible, of the following lines:

From Viacha (La Paz) or Coro Coro to Oruro, from Oruro to Cochabamba, from Uyuni to Potosí, from Potosí to Tupiza, and the first section of 100 miles of the line from La Paz to Puerto Pando, employing the funds provided by the Brazilian indemnity. It is proposed also that, for the construction of the line from La Paz to Puerto Pando (the "Yungas" line), there shall be assigned, in addition, the funds to be derived from the increase of duties to be imposed upon cocoa, this line being of special importance to the "Yungas" section, which is the principal cocoa-producing district of the country.—*Consular Report*.

News from Albany.

Once not so long ago a kindly government of the New York Central Railroad was prodigal in the distribution of passes over its lines from here to Albany. This generosity was not wholly unknown to the legislators. Then came a season of much talk wherein it was set forth that an important law was being violated. Following came a widely announced agreement on the part of the railroads of the east that the pass privilege had been abolished. It cannot be said that a particular class of travel has shown any heavy decrease, and it is a matter of speculation as to whether the receipts would tally identically with the number of fares. If they didn't there is but one answer. In other times Mr. Moses Dinkelspiel, not entirely unknown at the Hoffman House in this city and the Hotel Ten Eyck in Albany, commanded apparently inexhaustible resources in the way of transportation. If a man were "right" he needed but ask and it was given him. Recently, it is whispered, Mr. Dinkelspiel has been appearing in his former haunts and it is said that, through a strange coincidence, methods of riding on the railroad without first observing the preliminary of buying a ticket have been discovered. Those fortunate enough to enjoy this favor have been furnished a little stiff pasteboard card in place of the flimsy, double jointed ticket which the conductor formerly took up and turned in. . . . —*New York Herald*.

One to Each 4,257 Miles.

The Burlington will pay more attention to the movement of fast freight and has appointed two inspectors, who will travel over the system investigating all delays and making suggestions where improvement can be effected. These inspectors are J. W. Cunningham, a locomotive engineer of Aurora, and G. E. Wilkinson, assistant to General Manager Gruber.—*Exchange*.

Disastrous Fire at Moncton.

The Intercolonial shops at Moncton, N. B., were almost totally destroyed by fire on February 25, and the cost of replacing them will approximate \$1,000,000. In addition to the buildings destroyed there were over 100 passenger and freight cars, together with a large amount of machinery.

The Right to Route Your Freight.

A press despatch from Washington says that the "citrus fruit" cases have been decided favorably to the railroads by the Supreme Court of the United States, in an opinion by Justice Peckham. The cases involved the right of the railroad companies to designate the route for fruit shipped east after leaving their own lines. The proceeding was begun by the Interstate Commerce Commission to test the legality of a joint order issued by the Southern Pacific and the Atchison in 1899 making a through rate of \$1.25 per 100 lbs. on oranges from Southern California points to the Missouri river and further east. In this order the railroads reserved the right of routing the freight east of their own terminals. The commission held that the routing provision was virtually a contract for pooling, and also violated the provision of the law requiring stable and open rates. The Supreme Court holds that the routing agreement aided in preventing rebates and that the only question was whether the carrier that takes the fruit from the shipper in California has the right to insist upon the rule permitting it to route the freight at the time it is received from the shipper.

Justice Peckham said: "We think there is nothing in the act

which clearly prohibits the roads from adopting the rule in question. The common carrier need not contract to carry beyond its own line. If it agrees to transport beyond its own line it may do so by such lines as it chooses, and may guarantee the through rate on condition that it has the routing. Having the right to agree on a joint through tariff on terms mutually satisfactory, we think that the agreement does not violate any provision of the commerce act, and there is no evidence in this case which shows that there has been any such violation."

The Selection of a Commission.

Much has been heard lately of a plan for appointing the prospective new members of the Interstate Commerce Commission in a way that they may represent various "interests." A representative of railway employees, another of railroad managers, another of shippers, are some of the favorite suggestions for places on the Interstate Commerce Commission. The assumption seems to be that the commission will make rates as the outcome of a process of pulling and hauling among the interests represented upon it. What kind of work would be expected of a court or an administrative body under such conditions? Experience shows what sort of management must be anticipated in a business establishment whose board of directors is concerned with anything rather than the welfare of the enterprise itself. Judges are selected presumably because of their legal ability in the first instance; directors should be because of their serviceability or attachment to the enterprise at hand; members of administrative commissions, because of the similarity of ideas and their ability to act in harmony, supplementing one another's good and weak points. It is by no other method that the Interstate Commerce Commission can be given the best chance to show what it can do. To select its members because of their connection with different interests, or on a purely geographical basis, as now proposed by the Senate Committee, would be the surest way of preventing the commission from attaining any satisfactory results.—*Journal of Commerce (New York)*.

Metropolitan District Railway Electrification.

This railroad has not yet, of course, derived financial benefit from its electrification. The days are too early. Electric traction was only partially commenced on this line on July 1, and was not completed until December. The necessity of continuing steam working, along with electric, involved special expenditure, delayed the completion of the automatic signal installation, interfered with train service, and prevented the running of a sufficient number of trains during the rush hours. Total receipts showed an increase of \$29,600, but working expenses, due to the causes mentioned, were \$145,134 greater. Net profit showed a corresponding decrease of \$115,527. The total cost of the electrical equipment and installation, including 434 cars, has been \$8,150,000. To this there must be added estimated further expenditure of \$114,000 still to be made. This includes the cost of 70 more cars.

Wisconsin in 1874.

In a small, neat, uncarpeted room William R. Taylor, 86 years old, the Granger Governor of Wisconsin, who made the railroads tremble a generation ago, is dreaming away his declining days at the Gisholt Home for the Aged, at Madison, Wis. From his south-west window he beholds glistening in the sunlight the dome beneath which in palmier days he once ruled a sovereign commonwealth. The aged Governor takes little interest in public affairs now. His great weight of years, illness and privations of late have made it necessary for him to keep close to his room and forego all exertion as well as reading. Here is his own story of his campaign and the fate of his reforms:

"In that day the railroads were far more arrogant than they are to-day. The principle had not then been established that the people were above the corporations, and that the state had the full power and right to regulate them. . . . They committed shameful abuses upon the people. They put their lines through without paying for right of way, and claimed the right to charge what rates they pleased. In order to do up their rivals they also practiced the grossest discrimination. They made and unmade towns through rebates. A mighty protest went up from the people, and our party rode into power over the regular Republican ticket. We had a majority in the Legislature, and on March 1, 1874, we passed the Potter law relating to railroads, telegraph and express companies. We established a Board of three Railroad Commissioners with large powers. It classified freights, fixed the maximum fares for passengers and otherwise sought to curb the arrogance and power of the railroads.

"The railroads at once served notice on me that they did not propose to abide by the law, and I issued a proclamation that if necessary the whole power of the state would be invoked to compel them to obey it. They got the opinion of great railroad attorneys in the east, like W. M. Evarts, of New York, who held that the law was unconstitutional in that it invalidated the obligation of contracts and confiscated property. Of course, it was only a question of time when the courts would have to pass upon it. There

was then a vacancy in the chief justiceship of the Supreme Court, which I had to fill.

"I had a poor field to pick from, as practically every lawyer of any ability was committed one way or the other on the questions. Most of them had been retained by the railroads. I finally decided upon E. G. Ryan. . . . The railroad party claimed Ryan at once, but he turned out all right. I also called in Judge David Davis, of the United States Supreme Court. Judge Davis was a very wealthy man, and it was thought for that reason he might decide for the railroads, but again our judgment proved good.

"It was a great legal struggle, and we had the biggest lawyers that railroad money could buy pitted against us, but we won. The Supreme Court decided that the Potter law was constitutional, and that the state had full power to regulate corporations of its own creation.

"The cause for the change of sentiment with the people? It was railroad money—pure and simple. They bought up the newspapers, the lawyers and the courts and deceived the people. They piled money in from the east. The people had also been corrupted by the pass evil. We passed an anti-pass law and its enforcement hurt me.

"In my second message I showed that the industrial depression was not peculiar to Wisconsin, but prevailed largely throughout the country. . . . Joining hands with the railroads were the lumber thieves of the north. They had stolen themselves rich, and I had threatened proceedings against them. They studied every candidate for the Legislature, approving only of such as they could buy or influence.

"Well, we couldn't stand the tide. We were before our time. When Governor Ludington was inaugurated he urged the repeal of both the Potter and the anti-pass law. A bill known as the Vance bill was passed, which took out the vitals of the law." . . . —*Exchange*.

Light Rails in 1905.

During 1905 the production in this country of all kinds of rails weighing under 45 lbs. to the yard shows a decrease of 65,303 tons as compared with 1904, but the production of rails weighing 45 lbs. and less than 85 lbs. shows an increase of 278,947 tons in 1905 over 1904. The great increase in the weight of rails in 1905 as compared with 1904 was, however, in sections weighing 85 lbs. and over, in which the increase amounted to 873,902 tons.—*Bulletin of the Iron and Steel Association*.

Dinner to Mr. Daniels.

At the Waldorf-Astoria Hotel, New York City, on the night of February 20, a dinner was given to Mr. George H. Daniels, Advertising Manager of the New York Central Lines, by a few of his friends; that is to say, about 500 of them. They came from Massachusetts, Florida, California, and most of the states between.

Manufacturing and Business.

Greene, Tweed & Co. have moved from 17 Murray street to more commodious quarters at 109 Duane street, New York City.

The Contractors' Supply & Equipment Co., Chicago, recently sold two Smith concrete mixers to the Missouri, Kansas & Texas Ry.

Armour Car Lines have placed an order for 20 steel underframes for tank cars with the Bettendorf Axle Co., Davenport, Iowa.

W. I. Hoklas, Saratoga, Wyo., in the engineering department of the D. Y. & P., is asking for catalogues and price-lists of railroad supplies and equipment.

August von Borries, the originator of the von Borries compound, which is used extensively on Prussian railroads, died at Meron, Germany, on February 14, at the age of 54.

The Northwestern Elevated has let a contract to K. E. Myers Co., of Chicago, for equipping 3½ miles of double-track (elevated) with third rail, and one mile of double-track (surface) with an overhead trolley line, on its Ravenswood extension.

The Ohio Brass Company has placed an order with the H. W. Johns-Manville Co., New York, for 850 squares of its "J.-M." asbestos roofing for its factories at Mansfield, Ohio, which were partially destroyed by fire last year and which are now being rebuilt.

The Farlow Draft Gear Company, Baltimore, Md., has just received orders for upwards of 1,800 sets of the Farlow draft-gear as follows: Kansas City Southern, 300 sets; Richmond, Fredericksburg & Potomac, 100 sets; Cudahy Packing Co., 225 sets; W. J. Rainey Co., 125 sets; Virginia & Carolina, 275 sets; Hocking Valley, 600 sets, and miscellaneous orders for 150 sets.

George W. Little, for the past four years Assistant Treasurer of the Pittsburg Spring & Steel Company, died on Friday, February 16, of pneumonia after an illness of one week. Mr. Little had a long experience in the spring business, having been originally connected, in the accounting department, with A. French & Company some 30 years ago, and continued with that company and its successors until 1902.

The order for the cattle guards to be used on the new electrified line of the West Jersey & Seashore, between Camden, N. J., and Atlantic City, has been given to the Climax Stock Guard Company, of Chicago. This contract calls for about 30 carloads of the well-known "Clay" guards. The installation, with all material, labor and transportation, is to be furnished by the Climax Company. The line is to be fully equipped by about June 1.

The state of Missouri has lost the suit in the Supreme Court of the United States which it brought against the state of Illinois to have the Chicago drainage canal declared a nuisance, and it is said that the immense power plant at Lockport, Ill., will now be begun. This project contemplates the development of 40,000 h.p. by a dam and electric generators, and the generators are now being built at the shops of the Crocker-Wheeler Co., Ampere, N. J. There will be four 4,000 K.V.A. three-phase, 60-cycle, 6,600-volt alternating current generators.

Albert Ladd Colby has opened an office as consulting and inspecting engineer and iron and steel metallurgist at 477 Central Park West, New York. Mr. Colby was for 18 years with the Bethlehem Steel Co. and for the last three years was nickel steel expert for the International Nickel Co. He was a juror in metallurgy at the Paris Exposition in 1900 and has visited all the prominent steel works abroad. He has been Secretary of the Association of American Steel Manufacturers and is a member of the Am. Soc. C. E., Iron and Steel Inst., A. S. M. E., Am. Inst. M. E., American Chemical Society, and Society of Chemical Industry. He is also the author of a book on Steel Specifications and a frequent contributor to the technical press.

Iron and Steel.

The Kansas City Southern has bought from the Illinois Steel Co. 50,000 tons of 85-lb. rails to replace all rails lighter than 75 lbs. in its main line between Kansas City, Mo., and Shreveport, La., a distance of 560 miles.

The demand for small rails continues quite active. A number of orders running from 100 to 1,500 tons each have been placed aggregating 7,000 tons. In addition the Texas Central has given an order for 5,300 tons. A few small orders have been given for structural shapes and fabricated steel, and about 9,000 tons were recently let in New York.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad conventions and engineering societies, see advertising page 24.)

Canadian Society of Civil Engineers.

At a meeting of the General Section February 22, a paper on "Formulæ for Reinforced Concrete Beams," by Mr. Henry Goldmark, was read and illustrated by lantern slides.

Railway Signal Association.

The next meeting of this Association will be held at the Great Northern Hotel, Chicago, on Monday, March 19, beginning at 10 a.m. At this meeting a new constitution and by-laws will be presented for adoption. Mr. F. B. Corey, of the Railway Engineering Department of the General Electric Co., will read a paper on "Charging of Storage Batteries from Alternating Current Circuits." Mr. W. N. Spangler, Supervisor of Signals, West Jersey & Seashore, presents a paper on "Substituting track circuits for detector bars," and W. A. D. Short, Signal Engineer of the Illinois Central, will read a paper on "Power Operated Distant Signals."

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Chicago & Alton.—B. F. Yoakum has been elected a director, succeeding W. B. Leeds, resigned.

Colorado & Southern.—J. M. Herbert, First Vice-President, has resigned.

San Antonio & Aransas Pass.—W. H. McIntyre has been elected President, succeeding C. R. Hudson, and W. M. Hobbs, formerly Assistant to the Second Vice-President of the Chicago, Rock Island & Pacific, has been elected First Vice-President and General Manager. M. D. Monserrate, Vice-President and General Manager, has been elected Second Vice-President.

Operating Officers.

Atlantic Coast Line.—W. B. Denham, First Assistant to the Third Vice-President, has resigned. See Georgia, Florida & Alabama.

Augusta & Florida.—Cecil Gabbett has been appointed General Manager.

Boyne City, Gaylord & Alpena.—J. K. V. Agnew, Assistant General Manager, Traffic Manager and Purchasing Agent, has resigned, to engage in other business.

Buffalo, Bradford & Kane.—A. B. Campbell, General Superintendent, has resigned to go to the Auditing Department of the Buffalo & Susquehanna. R. S. Bullis, Secretary, Treasurer, and General Freight and Passenger Agent, succeeds Mr. Campbell.

Gainesville & Gulf.—J. B. Cutler has been appointed General Superintendent and Traffic Manager, succeeding L. E. Barker.

Georgia, Florida & Alabama.—W. M. Legg, General Manager, has resigned. W. B. Denham, First Assistant to the Third Vice-President of the Atlantic Coast Line, succeeds Mr. Legg.

Lake Shore & Michigan Southern.—Edward A. Handy, who was recently appointed General Manager of this road, was born in



E. A. Handy.

1855 and is a graduate of the Massachusetts Institute of Technology. His first railroad service was in 1878, as assistant engineer on construction of the Atchison, Topeka & Santa Fe. The next year he was made assistant engineer of bridges and buildings for the same road, and in 1880 went to the Mexican National as locating engineer. In 1881 he was appointed Principal Assistant Engineer of the Northern division of that road, being promoted in 1883 to Chief Engineer. After five years he went to the Lake Shore & Michigan Southern as Engineer

of the Lake Shore division. In 1891 he was appointed Chief Engineer, his authority being extended in 1900 over the Lake Erie & Western. On July 5, 1905, he was appointed Assistant General Manager of the Lake Shore & Michigan Southern, the Lake Erie & Western, the Indiana, Illinois & Iowa, and the Lake Erie, Alliance & Wheeling, from which positions he is now promoted.

Philadelphia, Baltimore & Washington.—The headquarters of the Delaware division have been removed from Clayton, Del., to Wilmington.

Southern.—J. J. Cotter, Superintendent at Birmingham, Ala., has resigned. W. M. Deuel, formerly Assistant Superintendent at Knoxville, Tenn., and later Assistant Superintendent at Birmingham, succeeds Mr. Cotter. C. L. Harris, formerly Superintendent of the Missouri, Kansas & Texas, at Parsons, Kan., succeeds Mr. Deuel at Birmingham.

Union Pacific.—W. A. Whitney, Superintendent at Cheyenne, Wyo., has resigned.

Traffic Officers.

Indiana Harbor.—F. G. Hopper, Assistant General Freight Agent of this road and of the Indiana, Illinois & Iowa, has resigned to engage in other business.

New York Central & Hudson River.—J. F. Fairlamb, Auditor of Passenger Accounts, has been appointed General Passenger Agent, succeeding G. H. Daniels.

St. Louis & San Francisco.—The authority of John Sebastian, Passenger Traffic Manager of the Chicago, Rock Island & Pacific, has been extended over the St. Louis & San Francisco.

Engineering and Rolling Stock Officers.

Lake Shore & Michigan Southern.—M. J. McCarthy, hitherto Master Mechanic of the Michigan Central at St. Thomas, Ont., has been appointed Master Mechanic of the Michigan Southern division of the L. S. & M. S., having authority also over the Indiana, Illinois & Iowa, with office at Elkhart, Ind., succeeding C. W. Cross, transferred.

Pennsylvania.—A. C. Shand, Assistant Chief Engineer, has been appointed Chief Engineer, succeeding W. H. Brown, retired.

H. J. Huber has been appointed Assistant Master Mechanic at Verona, Pa., succeeding Taber Hamilton, transferred.

Wheeling & Lake Erie.—M. E. Wells, Traveling Master Mechanic, has been appointed Assistant Master Mechanic of this road and of the Wabash-Pittsburg Terminal, with office at Columbia, Ohio.

Special Officers.

Southern Pacific.—H. C. Pearce, General Storekeeper of the Chicago, Rock Island & Pacific, has been appointed General Storekeeper of the Southern Pacific, succeeding W. R. Ormsby, resigned.

LOCOMOTIVE BUILDING.

The Sumpter Lumber Co., Sumpter, Ala., has ordered one 37-ton Shay locomotive from the Lima Locomotive & Machine Co.

The Missouri, Kansas & Texas, as reported in our issue of February 2, has ordered 20 simple mogul (2-6-0) locomotives, 10 simple 10-wheel (4-6-0) locomotives, and five simple switching (0-6-0) locomotives from the Baldwin Locomotive Works, all for August delivery. The mogul locomotives will weigh 156,000 lbs., with 135,000 lbs. on the drivers; cylinders, 20 in. x 28 in.; diameter of drivers, 63 in.; wagon top boiler, with a working steam pressure of 200 lbs.; heating surface, 2,268 sq. ft.; 294 charcoal iron tubes, 2 in. in diameter and 12 ft. 8 in. long; Otis steel firebox, 102 in. x 56 in.; grate area, 39.6 sq. ft.; tank capacity, 7,500 gallons, and coal capacity, 14 tons. The 10-wheel locomotives will weigh 146,000 lbs., with 104,000 lbs. on the drivers; cylinders, 19 in. x 26 in.; diameter of drivers, 68 in.; wagon top boiler, with a working steam pressure of 200 lbs.; heating surface, 2,372 sq. ft.; 295 charcoal iron tubes, 2 in. in diameter and 14 ft. 3 in. long; Otis steel firebox, 100½ in. x 41¼ in.; grate area, 29.1 sq. ft.; tank capacity, 6,500 gallons, and coal capacity, 10 tons. The switching locomotives will weigh 147,000 lbs.; cylinders, 20½ in. x 26 in.; diameter of drivers, 57 in.; wagon top boiler, with a working steam pressure of 200 lbs.; heating surface, 2,139.8 sq. ft.; 335 charcoal iron tubes, 2 in. in diameter and 11 ft. 3 in. long; Otis steel firebox, 108½ in. long and 41¼ in. wide; grate area, 31.15 sq. ft.; tank capacity, 5,600 gallons, and coal capacity, eight tons. The special equipment for all includes: Westinghouse-American air-brakes, Simplicity bell ringers, Magnesia boiler lagging, National-Hollow brake-beams, Sargent brake-shoes for 10-wheel and switching locomotives, Buckeye couplers for switching locomotives, Nathan Manufacturing Co.'s injectors and sight-feed lubricators, Railway Steel Spring Co.'s springs, Crosby steam gages for mogul locomotives, Safety steam heat equipment for 10-wheel locomotives, and Standard steel driving and truck wheel tires.

CAR BUILDING.

The Armour Car Lines are building 400 refrigerator cars of 60,000 lbs. capacity at their own shops.

The Augusta Railway & Electric Co., Augusta, Ga., has ordered six trolley cars from the J. G. Brill Co.

The Canadian Pacific has ordered 500 steel cars of 100,000 lbs. capacity from the Dominion Steel Car Co.

The Georgia Southern & Florida has ordered three freight cars from Barney & Smith, for May delivery.

The Chicago, Milwaukee & St. Paul, it is reported, will build 400 cars of 60,000 lbs. capacity at its own shops.

The Montreal Street Railway Co. (Electric), Montreal, Que., is building 100 passenger cars at its Montreal barns.

The Cleveland & South Western Traction Co., Cleveland, Ohio, has ordered 15 interurban cars from the Niles Car & Manufacturing Co.

The Central of Georgia, as reported in our issue of Feb. 9, has ordered 1,000 steel hopper coal cars of 100,000 lbs. capacity from the Pressed Steel Car Co.

The Union Railway Company has just placed a rush order for 50 trolley cars. Address Edward A. Maher, President and Manager, 204 East 128th street, New York City.

The Virginia & Southwestern, as reported in our issue of February 9, has ordered 250 gondola cars of 80,000 lbs. capacity from the Western Steel Car & Foundry Co.

The Cincinnati, New Orleans & Texas Pacific is not to build any new cars, as reported, at its Gadsden shops at present, but is merely getting ready to rebuild 19 of its old flat cars.

The Boston & Maine has ordered 1,000 box cars of 60,000 lbs. capacity from the Western Steel Car & Foundry Co., in addition to its order which was recently reported in a previous issue.

The Kansas City Southern, as reported in our issue of February 2, has ordered 100 tank cars, of 10,000 gallons capacity, 200 gondola

cars of 80,000 lbs. capacity, and 10 cabooses from the American Car & Foundry Co.

The Texas Company, Beaumont, Texas, has ordered 50 oil-tank cars from the American Car & Foundry Co. These cars are to be built at the Milton, Pa., plant, and are to be delivered within 90 days. The underframes will be of metal.

The Munising Railway has ordered two 60-ft. combination passenger and baggage cars from F. M. Hicks & Co., for May delivery. The special equipment includes: Westinghouse air-brakes, Buhoop couplers, National steel draft rigging and Baker heating system.

The Chicago, Burlington & Quincy has ordered six double plow cars from the Rodger Ballast Car Co. These cars are for April delivery and will be built by the American Car & Foundry Co. They will be 32 ft. long x 9 ft. 3 in. wide x 4 ft. 1 in. high over all.

The Marquette & Southeastern has ordered two 60-ft. coaches and two 60-ft. combination mail, passenger and baggage cars from F. M. Hicks & Co. The special equipment includes: Westinghouse air-brakes, Buhoop couplers, National steel draft rigging, and Baker heating system.

The Interstate has ordered 14 wooden hopper cars of 80,000 lbs. capacity from the Western Steel Car & Foundry Co. The special equipment includes: Bettendorf bolsters, Western Steel Car & Foundry Co.'s brake-beams, Westinghouse air-brakes, Major couplers, McCord journal boxes, Railway Steel Spring Co.'s springs, "Diamond" arch-bar trucks and Griffin wheels.

The Midland Valley, as reported in our issue of February 9, has ordered four standard cabooses from the Mt. Vernon Car Manufacturing Co. These cabooses will be 36 ft. long and 9 ft. wide, over all. The special equipment includes: Christie brake-shoes, Westinghouse air-brakes, Ajax Metal Co.'s brasses, Tower couplers, Miner draft rigging, Hewitt journal boxes, Patterson-Sargent paint, and Mt. Vernon Car Manufacturing Co.'s wheels.

The Central of Georgia has ordered 1,000 hopper bottom steel coal cars of 100,000 lbs. capacity from the Pressed Steel Car Co. These cars will be 31 ft. 10 in. long, 10 ft. ¾ in. wide and 10 ft. 8 in. high, over all. The special equipment includes: Simplex truck bolsters and brake-beams, Lappin brake-shoes, Westinghouse air-brakes, Ajax brasses, Major couplers, Sessions draft rigging, McCord dust guards and journal boxes, and Railway Steel Spring Co.'s springs.

The Metropolitan Street Railway Company, Kansas City, Mo., has ordered 25 vestibule electric street cars from the St. Louis Car Co., and five cars of the same type from the American Car & Foundry Co., for June, 1906, delivery. These cars will have a seating capacity to seat 48 persons, and will measure 33 ft. 3½ in. inside. The bodies will be of wood and the underframes will be of wood and metal. The special equipment will include the Cambria Steel Company's axles, Curtain Supply Company curtain fixtures, Pantasote curtain material, Consolidated Car Heating Company heating system, Rodgers journal boxes, St. Louis Car Company's trucks and Griffin car wheels. Each of these cars will be equipped with four type G E 80 h.p. motors.

The Missouri, Kansas & Texas, as reported in our issue of January 26, has ordered 1,700 box, 300 ventilated box, 300 furniture cars, all of 60,000 lbs. capacity; 10 baggage and 10 chair cars, as reported in our issue of February 2, and eight postal cars from the American Car & Foundry Co., all for August delivery; and, as reported in our issue of January 26, 100 Rodger ballast cars of 80,000 lbs. capacity from the Rodger Ballast Car Co., to be built by the American Car & Foundry Co. The box cars will weigh 35,000 lbs. and 39,000 lbs., and measure 40 ft. 1 in. long, 9 ft. wide and 13 ft. 11½ in. high, over all. The furniture cars will weigh 37,000 lbs. and measure 43 ft. 10¼ in. long, 9 ft. 11¼ in. wide and 15 ft. 1½ in. high, over all. The baggage and chair cars will be 69 ft. 3½ in. long and 9 ft. 3½ in. wide, inside measurements. The postal cars will be 60 ft. long and 9 ft. wide, inside measurements. The ballast cars will be 32 ft. long, 8 ft. 8 in. wide and 4 ft. high, inside measurements. The special equipment for all includes: American Steel Foundries bolsters for box and furniture cars and Common-Sense bolsters for ballast cars; National-Hollow brake-beams; Diamond "S" brake-shoes; Westinghouse air-brakes for postal cars; Major couplers for box, furniture and ballast cars, and Janney couplers for baggage, chair and postal cars; Burrowes curtain fixtures and Pantasote curtain material for chair cars; Positive door fastenings and Security doors for box cars; Miner draft rigging; Safety heating system and Symington journal boxes for baggage, chair and postal cars; Pintsch light for chair and postal cars; Missouri, Kansas & Texas standard paint for all cars except ballast cars; Lawler steel platforms for baggage, chair and postal cars; Chicago roofs for box and furniture cars; Scarritt seats for chair cars; American Steel Foundries trucks with Barber roller bearings for box and furniture cars, and Rodger trucks for ballast cars; Pullman vestibules for chair cars and American Car & Foundry Co.'s wheels for box and furniture cars, and Paige wheels for baggage, chair and postal cars.

BRIDGE BUILDING.

BARNSTABLE, MASS.—Bids will soon be asked by the County Commissioners for building the proposed bridge over the Bass river. The bridge is to be 700 ft. long and cost \$20,000. Alfred Crocker is Clerk of the County Commissioners.

BOONVILLE, MO.—Bids are wanted March 7, by A. W. Nicol, Deputy County Clerk, for building a steel bridge 228 ft. long over the Blackwater river in Cooper County to cost \$4,000.

CANYON CITY, COLO.—The newspapers say that a railroad bridge is to be built over the Royal Gorge. The bridge is to be 2,800 ft. above the hanging bridge of the Denver & Rio Grande, and is to be built as a part of an electric railway from Cañon City to Florence. It is said that the line to the top of the Royal Gorge will be in operation this summer. The cost of all the railroads proposed will be \$500,000 and the suspension bridge spanning the chasm \$100,000 additional. The air-line distance from Cañon City to the highest point the road will reach is six miles, but a tortuous road 10 miles in length will be built.

CHICAGO, ILL.—The Chicago, Rock Island & Pacific is planning to build several bridges on its main line between this place and Colorado Springs, and on the line between Burlington and St. Paul, also on its southwestern lines.

CLINTON, KY.—The Fiscal Court will probably ask for bids at its April meeting for a bridge 125 ft. long. J. A. Porter may be addressed.

EVANGELINE, LA.—Plans are being made by Acadia and Calcasieu parishes to jointly build a bridge about 600 ft. long over the Bayou Nepique. G. H. Brooks, of Crowley, La., may be addressed.

GALLATIN, MO.—Bids will soon be asked by W. Donell, of Coffeyburg, Mo., for building a steel bridge 180 ft. long, to cost \$5,500, over the Grand river in Daviess County. W. R. Barnett may be addressed.

HENRIETTA, TEXAS.—Bids are wanted March 19, by C. L. Karsteter, County Clerk, for building a steel bridge 210 ft. long over the Big Wichita river in Clay County, to cost about \$5,400.

LEAVENWORTH, KANSAS.—Bids are wanted March 5, by the Board of County Commissioners, for building five steel bridges in Leavenworth County. J. W. Niehaus is County Clerk.

MADISON, NEB.—Bids are wanted by George E. Richardson, County Clerk, March 20, for building a number of steel bridges in Madison County.

NIAGARA FALLS, ONT.—The Niagara Frontier Bridge Company has been formed for the object of building a new bridge across the Niagara river. Work is to be begun before Dec. 31, 1906.

OPELOUSAS, LA.—Bids are wanted by C. C. Genung for building a steel bridge 150 ft. long over Bayou Courtableau. W. B. Robert may be addressed.

PAINTSVILLE, KY.—Bids are being asked by W. E. Litual for building an iron bridge over Paint creek in Johnson County. W. P. Davis is Clerk of the County Court.

PERRYVILLE, ARKANSAS.—Bids are wanted by J. N. Stone, County Judge, for building a steel bridge over the Fourchelafuve in Perry county.

SALINA, KAN.—Bids are wanted by G. J. Duncan, County Clerk, March 20, for building three steel bridges in Saline County.

TROY, MO.—Bids are wanted April 6 by the County Court for building a steel bridge 304 ft. long over the Cuivre river. M. R. Long is County Clerk.

VANCOUVER, B. C.—The wooden bridge over the Pitt river on the main line of the Canadian Pacific is to be replaced with a steel structure.

WARRENSBURG, MO.—Bids will be asked about September 1 by the County Commissioners for building between 35 and 40 steel bridges in Johnson County. C. A. Boyles is County Clerk.

WILLIAMSON, W. VA.—A bill has been introduced in the lower House of Congress authorizing William Smith and associates to bridge the Tug Fork of the Big Sandy river near this place, where it forms the boundary between West Virginia and Kentucky.

YARMOUTH, ME.—The Portland & Brunswick, on its proposed extension to this place, is planning to build a steel bridge over the Royal river, 115 ft. long.

Other Structures.

ABBEVILLE, S. C.—The shops of the Seaboard Air Line at this place, which were recently damaged by fire, with a loss of about \$25,000, it is said, are to be rebuilt.

BERKELEY, CAL.—The Southern Pacific will at once put up a new stone passenger station here to cost \$30,000.

BRUNSWICK, GA.—The Atlantic & Birmingham is negotiating for water front land as a site for terminals, to cost about \$500,000.

FORT COLLINS, COLO.—The Colorado Southern, it is said, has decided to make changes in its yards at this place, and to put up a new freight house and a new roundhouse.

ISHPEMING, MICH.—The Chicago & North-Western has decided to put up a new passenger station, to cost \$20,000.

JACKSON, MISS.—Improvements to be made by the Illinois Central in connection with its new freight yard and terminal includes the building of a freight house and passenger station.

JACKSONVILLE, FLA.—The Seaboard Air Line, it is said, will put up two brick warehouses, one 315 ft. long and the other 515 ft. long.

KANSAS CITY, MO.—It has been announced that contracts have been made for the purchase of 44 acres of land for a new union station to be built in this city, near Twenty-second street and Grand avenue (known as the South side site) subject to vacation of streets and alleys, and other necessary legislation by the City Council. The present depot has been in use since 1889 and has long been inadequate to meet the demands of travel. The providing of new passenger terminals has been under consideration for about three years. It was reported that a decision had practically been reached to rebuild near the present depot on the West bluffs, but during the flood of 1903 there was a depth of about six feet of water in the present depot and this caused the railroads to abandon this plan. Later a location in the north end of the city was considered, but the price placed by the Armour-Swift-Burlington Syndicate on land which it had acquired by purchase and reclamation from the Missouri river is said to have been so high as to make it inadvisable to adopt this site. The following roads are said to have agreed on the South side location: Atchison, Topeka & Santa Fe; Chicago, Milwaukee & St. Paul; Union Pacific; Chicago, Rock Island & Pacific; Frisco; Chicago & Alton; Missouri, Kansas & Texas. It is understood that the Missouri, Pacific, Burlington, Wabash, Kansas City, Southern, Chicago Great Western, St. Joseph & Grand Island and the Quincy, Omaha & Kansas City have not yet signified that they will come into the proposed new union station. The last four named lines do not enter the present union station, but use the Grand Central Station, which is situated in the north end of town.

MARSHALL, TEXAS.—The shops of the Texas Pacific at this place are to be enlarged and a number of stone and brick structures added, at a cost of \$100,000.

MASON CITY, IOWA.—The Chicago Great Western, it is said, has bought ground on which it will put up a new passenger station this summer.

MT. CARMEL, IND.—A contract has been let to Henry Dollney, of Indianapolis, for building new shops, a roundhouse, and putting up other buildings for the C., C., C. & St. L. The buildings will cost about \$60,000.

MUSKOGEE, IND. T.—The Midland Valley is arranging to build shops here, to cost about \$50,000.

NASHVILLE, TENN.—The Illinois Central, it is said, is planning to build a grain elevator at this place, to cost between \$300,000 and \$500,000.

NEW ROCHELLE, N. Y.—According to local reports the New York, New Haven & Hartford is planning to put up a large passenger station here to cost about \$100,000.

OGDEN, UTAH.—The Union Pacific and allied lines are to build a new power house and foundry, an oil house, storerooms and a new freight house.

SAN BERNARDINO, CAL.—The Atchison, Topeka & Santa Fe, it is said, is planning to enlarge its shops and yard at this place at a cost of \$400,000.

STAMFORD, CONN.—The New York, New Haven & Hartford is making improvements in its yard at this place, and will put up a new repair shop 50 ft. x 100 ft., storehouse 30 ft. x 50 ft., and office building 25 ft. x 100 ft. An addition will also be added to the roundhouse. The power house for electric traction between Stamford & New York is to be at Cos Cob, 3 miles west of Stamford.

STRATFORD, ONT.—Bids are being asked for building additions to the Grand Trunk shops here, to include a boiler shop 120 ft. x 225 ft., and a plate shop 50 ft. x 125 ft., to cost about \$100,000.

TORONTO, CAN.—The Railway Commission has granted permission for the building of the new passenger station here. Work is to be started by the Grand Trunk on the structure at once.

TORONTO JUNCTION, ONT.—The Canadian Pacific is reported hav-

ing bought land as a site for its shops, which are to be moved to this place.

WASHINGTON, D. C.—The Carnegie Institution of Washington has bought six acres of land north of the Pierce's Mill Road, and near Rock Creek Park and the Bureau of Standards, on which it is proposed to build at once a building to cost about \$100,000.

WAYCROSS, GA.—The Atlantic Coast Line, it is said, has given a contract to the Pennsylvania Bridge Co., of Beaver Falls, Pa., for building its shops at this place. The cost of the work will be about \$400,000. The contract calls for the completion by January of next year.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ALLENTOWN, TAMAQUA & ASHLAND (ELECTRIC).—This company has been organized at Harrisburg, Pa., with a capital of \$500,000, with William Lindsay, of Pittsburg, as President. Surveys are being made near Mahanoy City for the proposed road, to run from Slatington, Pa., west via Lehighton and Tamaqua to Mahanoy City, about 30 miles.

AUGUSTA & FLORIDA.—This company will begin work early in March on the balance of its road from Keysville to Augusta, Ga. (Oct. 13, p. 118.)

BEAUMONT, SOUR LAKE & WESTERN.—This company has filed an amendment to its charter to provide for an extension of its road from Sour Lake, northwest, to Humble, Tex., and thence south to Houston; also to extend its road northeast from Beaumont to De Quincy, in Calcasieu County, La., a total of about 125 miles.

BLACK MOUNTAIN.—This company, it is said, is planning to build a 50-mile extension from the coal fields in Lee County, Va., to a connecting point with the Virginia & Southwestern at the Boden Coke plant.

BRITISH COLUMBIA ROADS.—Robertson & Robertson, of Victoria, B. C., have applied to the Provincial Legislature for a charter to build a line with branches from Penticton, B. C., to a point on the southern border of British Columbia.

BROOKVILLE & MAHONING.—An officer writes that work on the proposed extension from Brookville, Pa., to Brockwayville, 21 miles, has been completed from Brockwayville to Hydes. At the latter place connection will be made with the Pittsburgh, Shawmut & Northern. The company is building with its own forces from Brookville to Knoxdale, at which point there are large coal fields. The maximum grade is one per cent., and maximum curvature 8 degrees. The work includes the building of three steel viaducts and a number of small steel girder bridges, for which contracts will soon be let. Edward E. Tait, Bradford, Pa., is President, and W. W. Henshey, Brookville, Chief Engineer. (December 22, p. 200.)

CANADIAN NORTHERN.—A contract has been given by this company to Mulkaney & O'Brien, for building an extension from Garneau Junction to Quebec, and from Mortfort Junction to Saint Jerome.

CANADIAN PACIFIC.—Bids are wanted March 10 by J. W. Leonard, Toronto, for ballasting, bridging and track laying work on the Sudbury branch between Romford and French river crossing, 40 miles.

CANADIAN ROADS.—Application is being made to build a line from Crows Nest, Alberta, east to Lethbridge, and thence to Medicine Hat; also for a line from the Montana boundary north to Lethbridge and Edmonton, with branches to Calgary and Medicine Hat.

COLORADO & SOUTHERN.—This company is planning to build a 300-mile extension northward from Orin Junction, Wyo., to a connection with the Yellowstone River, in Montana. The road will compete with the Burlington, which makes its connection with the Northern Pacific at Billings, on the Yellowstone. An engineering party is in the field. The proposed line extends through a fertile agricultural and grazing country. Work is proceeding rapidly on the Colorado & Southern's gulf extension. It is expected that the line will be completed this fall to Houston.

COLORADO, TEXAS & MEXICO.—President Morris B. Locke of this road is quoted as saying that contracts have been let for building 500 miles of its proposed road from Arkansas Pass, Tex., to Cheyenne, Wyo.

DELAWARE, LACKAWANNA & WESTERN.—According to newspaper reports this company has decided to extend its Erie & Central New York division, from its present terminus, at Cincinnati, N. Y., to South Otselle, about 12 miles.

ELMIRA ELECTRIC.—Incorporation has been asked for in New York by a company under the above name, with a capital of \$4,000,000. The company proposes to build a double-track electric

railroad from Rochester, N. Y., south to Elmira, 120 miles. Such a line would compete with the Erie and the Delaware, Lackawanna & Western for local passenger traffic. The Directors include: F. Eckstein, of 42 Broadway, New York; C. O. Geer, T. C. Buckingham, H. Gabel, S. Gifford and others.

ERIE.—See Honesdale & Hawley below.

FAYETTE VALLEY.—This company has been incorporated to build a railroad from a point on the Oregon Short Line at Fayette, Idaho, through the Fayette valley to a point near New Plymouth, 15 miles. The capital stock is \$100,000. C. W. Nibley is President; H. E. Dunn, Vice-President; A. B. Moss, of Fayette, Treasurer, and F. S. Murphy, Secretary. The directors are: H. E. Dunn, C. W. Nibley and F. S. Murphy, of Salt Lake City, and A. B. Moss, of Fayette, and B. T. Dunn, of Weed, Cal.

GRAND TRUNK PACIFIC.—Contracts have been let by this company as follows: For building the section of the proposed road from the Touchwood Hills to Saskatoon, Sask., 140 miles, to the Canadian White Co., of Montreal, and from Saskatoon to Edmonton, Alb., 317 miles, to Foley Brothers, Larsen & Co., of St. Paul. A contract has also been let to Greer Brothers, of Port Arthur, Ont., for 700,000 ties. This company now has 920 miles of road under construction.

GREAT NORTHERN.—Surveys, it is said, are being made by this company to build a line from Havre, Mont., near the junction point of a branch running southwest to Great Falls, Helena and Butte, or from a point further west (Burnham) northwest to the boundary line, about 70 miles, and thence through Medicine Hat, Assiniboia, an additional 70 miles, and northwest of that place 280 miles to Edmonton.

GULF, BROWNWOOD & CISCO.—Under this name a company has been organized, with office at Brownwood, Tex., and with a capital of \$61,000. The company proposes to build a railroad from Brownwood to Cisco, Tex., about 55 miles. Brooke Smith, J. T. Lee, J. C. Weakley, all of Brownwood; G. H. Connell, of Fort Worth; A. T. Maxwell, of Cisco, and others are interested.

HONESDALE & HAWLEY (ERIE) (ELECTRIC).—Under this name the Erie, it is reported, has organized a company to build a line to connect Honesdale and Hawley, Pa., eight miles. The Erie has owned the right of way for a long time. Permission has been granted by the Common Council of Honesdale to build through that borough, and the work is to be started at once.

ILLINOIS CENTRAL.—Announcement has been made by this company that contracts have been let for building its new line from Corinth, Miss., southeast to Haleyville, Ala., about 80 miles. C. D. Smith & Co., of Birmingham, have the contract for building from the north end, and George O. Clifton & Co., of Chicago, from the south end. Work is to be finished by January, 1907.

KENTUCKY MIDLAND.—Incorporation has been granted a company under this name in Kentucky to build a railroad from Madisonville, Ky., east to Central City, about 26 miles. The line will run through a rich coal section in Muhlenberg and Hopkins Counties. Connection is to be made with the Louisville & Nashville at Madisonville, and also with the Illinois Central and the Louisville & Nashville at Central City. The maximum grade will be 1 per cent., and maximum curvature 4 deg. There will be a tunnel through Muhlenberg ridge about 750 ft. long, and a pile bridge about one mile long over Pond river. The line is to be completed by August of this year. The names of the incorporators are not given.

KETTLE RIVER VALLEY.—Application has been made by this company to Parliament for permission to increase its capital to \$5,000,000, and to build extensions as follows: From Midway, B. C., to Hedley, in the Similkameen Valley; from Hedley, north, for a distance of 20 miles to Twenty Mile Creek, and from this extension to Penticton, B. C.; also for permission to secure trackage rights over the Columbia & Western between Grand Forks and Midway and on its branch lines. An officer writes that contracts are to be let about April 1, for building 50 miles of road in a northerly direction from its present northern terminus.

MARSH FORK (TIDEWATER).—Incorporation has been granted this company in West Virginia to build an extension of the Tidewater to the Ohio River at the mouth of the Great Kanawha River, approximately 100 miles from Surveyor Station in Raleigh County, on the Deepwater, which is the West Virginia end of the Tidewater route. The officers of the company are: W. N. Page, President; G. W. Imboden, Vice-President; W. H. Evans, Secretary; G. H. Church, Treasurer; J. J. Corell, Assistant-Treasurer; Raymond DuPuy, General Manager, and H. Fernstrom, Chief Engineer.

MEXICAN ROADS.—A concession has been granted by the Mexican Government to Richard Honey to build a railroad from Tampico west to Mexico City.

MICHIGAN CENTRAL.—Bids are to be opened March 8, for building the proposed tunnel under the Detroit river. The contracts are to be decided on by a board consisting of W. J. Wilgus, New York, Vice-President of the New York Central, who is Chairman; H. A. Carson, of Boston, and W. S. Kinnear, Vice-President of the Michigan Central.

MISSOURI, ARKANSAS & SOUTHWESTERN.—A charter has been granted this company in Missouri, with a capital of \$2,000,000, to build a railroad from a point in Dunklin County to Batesville, Mo. R. W. Ernhardt, A. T. Evans, T. M. Twaldrop and others are interested.

NORTHERN PACIFIC.—Contracts are reported let by this company to Porter Brothers & Walsh, railroad contractors, of Spokane, Wash., for extending its line from Culdesac, Idaho, southeast through a rich agricultural section bounded by the Snake, Clearwater and Salmon rivers, to Grangeville, about 55 miles. It is expected to have the line completed by the first of next year.

PIERRE, RAPID CITY & NORTH-WESTERN (CHICAGO & NORTH-WESTERN).—The Winston Brothers Company, of Minneapolis, which has the general contract for building this proposed extension of the North-Western from Pierre, S. Dak., west to Rapid City, about 155 miles, has sublet a six-mile section of the work to the Calhoun Construction Company, of Spearfish, S. Dak. The work will begin at a point about 25 miles west of Rapid City. (October 27, p. 125.)

ST. MARYS & WESTERN.—An officer writes that this company has completed the first 10 miles from St. Marys, Pa., to Trout Run on its proposed road from Johnsonburg, Pa., via St. Marys to Benezette, 25 miles. E. L. Willard, St. Marys, is Chief Engineer.

SOUTHERN PACIFIC.—According to newspaper reports this company has completed nearly 100 miles of its projected line, which it is building, under a concession from the Mexican Government, through the states of Sonora, Sinaloa and Jalisco, and the territory of Tepic to connect with the Cananea, Yaqui River & Pacific in the north, and with the Mexican Central in the south. The Southern Pacific is to receive a bonus of about \$19,200 a mile. The road is to be built in four sections, the first is from some convenient point on the C. Y. R. & P. (which is controlled by the Southern Pacific) near the City of Alamosa, Sonora, southeast, to Culiacan and Sinaloa. The second section is from the latter place to Mazatlan, and the third from some convenient point on the line between Culiacan and Mazatlan near San Diego to Tepic in the territory of the same name. The remaining section is from Tepic to a point on the Mexican Central between San Marcos and Guadalajara, the capital of Jalisco, to which point the Mexican Central extension reaches.

STONE CANYON.—This company, recently incorporated in San Luis Obispo, Cal., with a capital stock of \$300,000 by J. A. Chanslor, W. A. Sloane, I. W. Hellman, Jr., and E. W. Mason, will rush construction this spring on its proposed road from a point on the Southern Pacific near San Miguel, north through San Luis Obispo and Monterey counties to a point on Nelson creek, Monterey County, about 21 miles. The company has about 1,000 acres of soft coal in Stone Canyon, and has bought 100 acres of land at San Miguel as a site for its terminal and for shops, yards, etc.

TIDEWATER.—See Marsh Fork.

UNION PACIFIC.—According to a Chicago despatch, Union Pacific officials in that city have announced that all needed terminals in Seattle, Wash., for an extension of the Harriman Lines to that city have now been secured. Surveys on the line to be built from Portland to Seattle, probably under the charter of the Washington Northern, are being made as rapidly as possible.

VANCOUVER, WESTMINSTER & YUKON.—Application will be made to the Dominion Parliament for permission to build branch lines south from Anderson Lake and Green Lake along Lilloset Lake to the international boundary.

RAILROAD CORPORATION NEWS.

ATCHISON, TOPEKA & SANTA FE.—Gross earnings for the month of January were \$6,536,985, an increase of \$1,129,244; net earnings \$2,286,437, an increase of \$718,026.

BOSTON & MAINE.—Gross earnings for the six months ended December 31 were \$20,379,882, an increase of \$1,436,146; net earnings \$5,926,732, an increase of \$262,237. The surplus after charges was \$2,113,635, an increase of \$233,219.

CAROLINA NORTHERN.—See Charleston & Raleigh.

CHARLESTON & RALEIGH.—This is the new name of the Carolina Northern, which was recently sold to the bond holders. (October 27, p. 136.)

CHICAGO ELEVATED.—It is reported that the Northwestern Elevated

and the Oak Park will be merged. This is said to be the first step in the final merging of all the elevated lines, which operate 105 miles of road and have, in all, \$51,023,800 stock and \$49,304,150 bonds outstanding.

CHICAGO GREAT WESTERN.—Gross earnings for the half year ended December 31 were \$4,627,330, an increase of \$626,391; net earnings \$1,699,109, an increase of \$398,397. The surplus after charges were \$672,044, an increase of \$401,607. The dividend on the preferred A stock was \$284,310, leaving a surplus equivalent to a semi-annual payment of 2 per cent. on its B stock, and about four-tenths of 1 per cent. on its common stock.

CHICAGO TERMINAL TRANSFER.—Receivership proceedings have been begun by the United States Trust Co. acting for the holders of \$16,500,000 first mortgage 4 per cent. bonds of 1947, on which, it is alleged, the company has defaulted payment of semi-annual interest three consecutive times.

CINCINNATI, HAMILTON & DAYTON.—According to the report of the receiver the total receipts from December 5 to December 31 were \$1,720,763, which includes \$511,830 raised by the sale of receiver's certificates. The total disbursements were \$1,303,453, of which \$436,725 was interest on funded debt.

DELAWARE & HUDSON.—Gross earnings for the six months ended December 31 were \$6,359,612, an increase of \$428,015; net earnings, \$2,724,432, an increase of \$88,739. The surplus after charges \$1,234,592, an increase of \$72,148.

DELAWARE, LACKAWANNA & WESTERN.—Gross earnings for the quarter ended December 1 were \$3,034,955, a decrease of \$128,675; net earnings \$1,553,849, a decrease of \$174,251. The surplus after charges was \$953,522, a decrease of \$150,386.

GEORGIA, FLORIDA & ALABAMA.—At a meeting of the directors, to be held on March 6, the Carrabelle, Tallahassee & Gulf will be merged with the Georgia, Florida & Alabama. The C., T. & G. runs from Carrabelle, Fla., to Tallahassee, 50 miles, and has been operated under lease by the G., F. & A.

GEORGIA SOUTHERN & FLORIDA.—Blair & Co., of New York, have bought \$270,000 5 per cent. equipment notes of this company.

GRAND TRUNK.—Gross earnings for the year ended December 31 were \$29,247,480, an increase of \$1,484,672; net earnings \$8,498,682, an increase of \$747,290. The surplus after charges was \$3,522,042, an increase of \$781,922. To this surplus is to be added \$33,534, as the surplus of the Detroit, Grand Haven & Milwaukee, and subtracted, \$87,480, which is the deficit of the Canada Atlantic, making a surplus of \$3,468,096 for the entire Grand Trunk System.

GRAND TRUNK PACIFIC.—This company is applying to the Dominion Parliament for permission to issue \$25,000,000 of debenture stock instead of \$20,000,000 of preferred stock, for which permission has already been obtained.

MINNEAPOLIS & ST. LOUIS.—Plympton, Gardiner & Co., and Kean, Van-Cortland & Co., of New York, have bought \$5,000,000 of this company's five-year 5 per cent. gold notes of 1911, subject to call at par and interest after February 1, 1908. The proceeds from this sale will be used to extend the Watertown division westward 250 miles, to the Missouri river, at LeBeau, S. Dak., and northwesterly to Leola, S. Dak. The notes are secured by the deposit of \$6,250,000 first mortgage 4 per cent. bonds and by the entire capital stock of the Minnesota, Dakota & Pacific, a subsidiary company which is building the above extension.

NORTHERN CENTRAL.—Gross earnings for the year ended December 31 were \$10,531,962, an increase of \$243,758; net earnings \$2,061,397, a decrease of \$305,436. The surplus after charges was \$2,238,787, an increase of \$161,656.

OCEAN SHORE (ELECTRIC).—This company, which is building a double track trolley road from San Francisco to Santa Cruz, Cal., 81 miles, of which 10 miles are completed, has bought the United Traction Company, of Santa Cruz. The Traction Co. has 18 miles of 3 ft. 2½ in. gage road in Santa Cruz and to Capitola. It has \$750,000 capital stock all outstanding, and \$750,000 first mortgage 5 per cent. bonds of 1935, of which \$300,000 is outstanding.

PHILADELPHIA COMPANY.—There have been deposited 320,000 shares of this company's stock. This is the amount necessary to make operative the plan for the acquisition of a majority of the Philadelphia Co. stock by the United Railways Investment Co. (Feb. 23, p. 62.)

YOSEMITE VALLEY.—This company, which has nearly completed 35 miles of its road from Merced, Cal., to the Yosemite Valley, a total of 70 miles, has sold \$850,000 of its \$1,000,000 first mortgage 5 per cent. sinking fund bonds and is now offering the balance for sale.

